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THIRD SERIES VOL 55 NUMBER 12 OCTOBER 1948

THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

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Almshouses at Chipping Campden, Gloucestershire, now being reconditioned. From a photograph by Reece Winstone, A.R.P.S.

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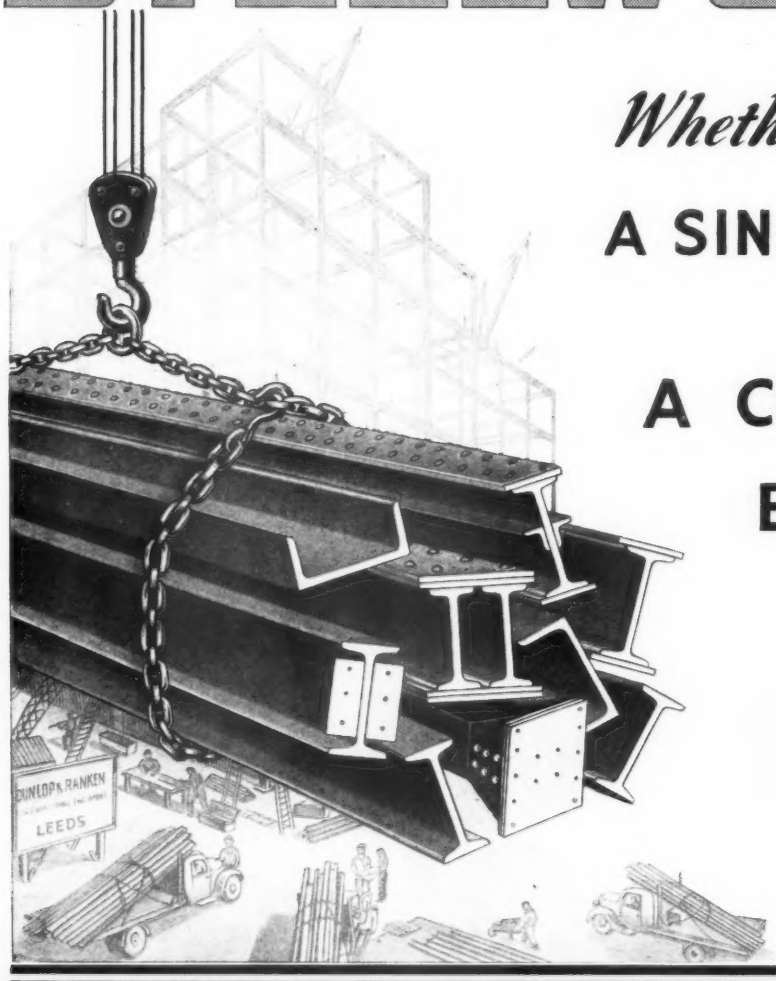

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THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

THIRD SERIES VOL 55 NUMBER 12 : OCTOBER 1948 : 66 PORTLAND PLACE LONDON W1 : TWO SHILLINGS & SIXPENCE

Inauguration of the 1948-49 Session

On Tuesday 9 November the President, Mr. Michael T. Waterhouse, M.C., B.A.Oxon, will open the Session and deliver his Inaugural Address. Sir Harold Emmerson, K.C.B., Permanent Secretary to the Ministry of Works, will propose a vote of thanks to the President, and it will be seconded by Mr. L. Sylvester Sullivan [*F*]. During the evening the President will unveil the portrait of his predecessor, Sir Lancelot Keay, which has been painted by Mr. James Gunn.

The Inaugural General Meeting is one of the more formal of Institute occasions. Many Honorary Fellows and Honorary Associates attend it, together with the Presidents and Secretaries of other learned societies. It is customary for the President to review the general situation in architecture and to indicate possible trends in the immediate future. There is therefore always a good attendance of members.

Mr. Richard Neutra at the R.I.B.A.

The celebrated American architect, Mr. Richard Neutra, has accepted the invitation of the Council to become an Honorary Corresponding Member of the R.I.B.A. Mr. and Mrs. Neutra have recently been on a short visit to this country and the continent. They were entertained to tea by the President on 6 October. Also present at the tea party were Professor Sir Patrick Abercrombie, Mr. A. W. Kenyon, Vice-President, and Mr. A. B. Knapp-Fisher, Vice-President, and senior members of the R.I.B.A. staff. Mr. and Mrs. Neutra were shown round the building, spending a considerable time in the Library. In the evening Mr. Neutra addressed a special general meeting of the Architectural Association at which Mr. Kenyon represented the President, R.I.B.A.

New Schools Exhibition

In view of the demand for the New Schools Exhibition, three large photographic copies have been made and coloured so as to resemble the original screens which were in the exhibition. One copy has already left for Stockholm where it will be exhibited in connection with the British Week. One copy will shortly be sent to Prague; this follows a very strong request by the Czechoslovak Embassy in London for this exhibition which resulted from the great interest which Mr. Laboutka and Mr. Maran, two recent Czechoslovak visitors to the R.I.B.A., took in the exhibition; they recommended it as showing that England is far ahead of any other country in the matter of school planning.

R.I.B.A. Industrial Conference and Exhibition

The major R.I.B.A. exhibition for 1949, to be held early in the spring, will deal with industrial building. In connection with this exhibition, a conference of architects and industrialists will be held at the Royal Institute. The object of the conference will be to give architects and industrialists an opportunity of getting together and discussing their planning problems. Fuller details of the actual sessions of the conference and of the exhibition will be announced at a later date. The Royal Institute has obtained the support of both the Federation of British Industries and the Trades Union Congress for the conference, and they will be of considerable assistance in helping the Institute to find speakers among industrialists and others connected with industry.

Working Drawings Exhibition.

The annual exhibition of architects' working drawings will be on view at the R.I.B.A. from Thursday 18 November to Friday 26 November. The following architects have kindly undertaken to exhibit working drawings: Sir Giles Gilbert Scott [*F*], Mr. S. H. Loweth [*F*], Mr. G. A. Jellicoe [*F*] and Mr. Sydney Tatchell [*F*]. The Students' Evening will be held at 6 p.m. on Tuesday 23 November and invitations are being issued to architectural schools in the London area so that their students may attend.

Lord Morrison new Parliamentary Secretary to M. o. W.

The appointment of Lord Morrison as Parliamentary Secretary to the Ministry of Works, in succession to the late Mr. E. F. M. Durbin, M.P., who was drowned on 3 September while rescuing his daughter from the sea at Crackington Haven, Devon, has been approved by the King.

Lord Morrison is 66. From 1929 to 1931 he was Parliamentary Private Secretary to the late Mr. Ramsay MacDonald, who was then Prime Minister. Lord Morrison was created a baron in 1945.

Gift Parcels from Australia

The Royal Australian Institute of Architects have again offered to send 500 gift parcels at Christmas to architects in this country. At their request the R.I.B.A. have sent a list of names, made out in collaboration with the Allied Societies and the Architects' Benevolent Society. This generous gesture of friendship is one that will be warmly welcomed by all architects in this country, whether their names are on the list or not. It reveals a genuine appreciation by our Australian colleagues of the difficulties being experienced and the efforts being made in this country.

The Cost of House Building

The report of the Girdwood Committee, of which we publish an abstract in this JOURNAL, is a factual analysis of house-building costs during the first three post-war years which is extremely valuable, both to architects and the community. The report substantiates the generally-held opinion that costs are too high to allow of a sound financial housing policy with economic rents. At the same time the Committee does not hold out any great hope of a substantial reduction with wages at their present relatively high level, nor does it see possibilities as yet of really pronounced reduction from the use of prefabrication. Some amelioration is to be expected when an abundant flow of materials diminishes hold-ups due to non-delivery, and if the incentive system succeeds in bringing operatives' output—what the Committee calls 'the problem of personal effort'—up to or above pre-war level. Discussion is likely to rage most fiercely round the Committee's statements that structural and equipment standards are higher than we can afford, and that space standards are unduly generous.

Retirement of Mr. Baker

The staff of the R.I.B.A. said goodbye to Mr. F. G. Baker at a small party on 1 October. The Secretary, R.I.B.A., in presenting Mr. Baker with a watch and cigarette lighter on behalf of the staff, spoke of the great contribution to the work of the Royal Institute which Mr. Baker had made by his organizing ability, his thoroughness and his immense capacity for hard work. In reply, Mr. Baker congratulated the R.I.B.A. on having appointed Mr. H. R. Williams as his successor and wished him as pleasant a time as he himself had had. He then read out his letter of appointment to the staff of the R.I.B.A. The letter was written in a clerkly longhand on a fine quality stiff paper and the following are its terms:

3rd September 1900

Dear Sir,

I am now formally offering you the post of Junior Clerk at the R.I.B.A. at a commencing Salary of £35 per annum. I would like you to begin your duties on Monday, 10th instant.

I reserve to myself the right of terminating the engagement at the end of the first month; after which the engagement shall be terminated by a month's written notice on either side.

You will be expected to attend at the Institute punctually at 10 a.m. every morning. On Saturdays the office closes at 2 o'clock. On other days it closes nominally at 5.0, but you will be expected to remain after that hour whenever your services are required. On such occasions your tea will be provided. You will have an hour's interval in the middle of the day (save on Saturdays) for lunch. You will also have three weeks' holiday in the year.

I shall be glad of a reply from you by return.

Yours faithfully,

(Signed) W. J. LOCKE,
Secretary.

Mr. Baker said he had always kept the letter in case he wished to leave at any time or to claim his tea whenever he worked late! On view at the party was the illuminated address presented to Mr. Baker by the Council on his completion of forty years' service and a bouquet of flowers from the staff to Mrs. Baker, who was unable to be present owing to ill-health.

The New A.A. Journal—Erratum

In the last JOURNAL we attributed the new make-up of the ARCHITECTURAL ASSOCIATION JOURNAL to Mr. Hugh Casson [*A*]. While Mr. Casson as retiring Honorary Editor was responsible for initiating the change, the bulk of the work has been done by the new Honorary Editor, Mr. F. E. B. MacManus [*F*] in co-operation with Mr. Robert Harling, the typographer and cover designer. We apologise for the mistake.

Committee on Building Documentation

A British National Committee on Building Documentation was set up last November by the Association of Special Libraries and Information Bureaux (A.S.L.I.B.) at a meeting held at the R.I.B.A. In February of this year the committee was recognized by the National Committee on Documentation and in April by the Ministry of Works who undertook to provide the secretariat. The chairman is Mr. B. Agard Evans, Librarian of the Ministry of Works. The R.I.B.A. representatives are Mr. R. E. Enthoven [*F*] (also representing the Architectural Association), and Mr. H. V. Molesworth Roberts, of the Library staff. The function of the committee is to promote co-operation between bodies providing information in the building industry.

Pictures in the R.I.B.A. Canteen

Arrangements have been made for pictures by young painters to be on view on the walls of the R.I.B.A. canteen. They will be changed from time to time. The purpose of exhibiting these pictures, apart from that of providing decoration, is to bring to the notice of architects the work of the younger British painters who are not able to hold one-man shows in the usual galleries. The names of the painters and the prices of the pictures will be stated.

Centenary of Antwerp Architectural Society

The centenary celebrations of the Société Royale des Architectes d'Anvers were celebrated on 23 to 25 September and the President R.I.B.A. sent a message of congratulation. Unfortunately the notice given was too short to allow a representative to be sent over to Antwerp and H.M. Ambassador at Brussels kindly sent a member of his staff to represent the R.I.B.A. officially.

Pension and Family Provision for Architects

The Architects' Benevolent Society has decided to re-open the scheme of Pension and Family Provision Assurance for Architects which was suspended during the war.

The scheme has now been thrown open to all architects and their draughtsman assistants in Great Britain and Northern Ireland. It provides at a reasonable cost:—

1. A pension for members of the scheme upon retirement.
2. An income for dependants in the event of the member's death before retiring age.
3. Provision for members without dependants.

The Scheme has been brought up to date to conform with the latest principles of pension and life assurance practice; changes are chiefly for the benefit of policy-holders. One concession is that there is no longer a limit to the number of units which can be taken.

Members interested are invited to return the enclosed prepaid enquiry card, or to write for particulars to the Architects' Benevolent Society Insurance Committee, 66, Portland Place, W.1.

Colour and Lighting in Factories

The Council of Industrial Design and the British Colour Council are to hold a course for architects and interior designers on Colour and Lighting in Factories at the R.I.B.A. on 24, 25 and 26 November. Full details are given on page 562.

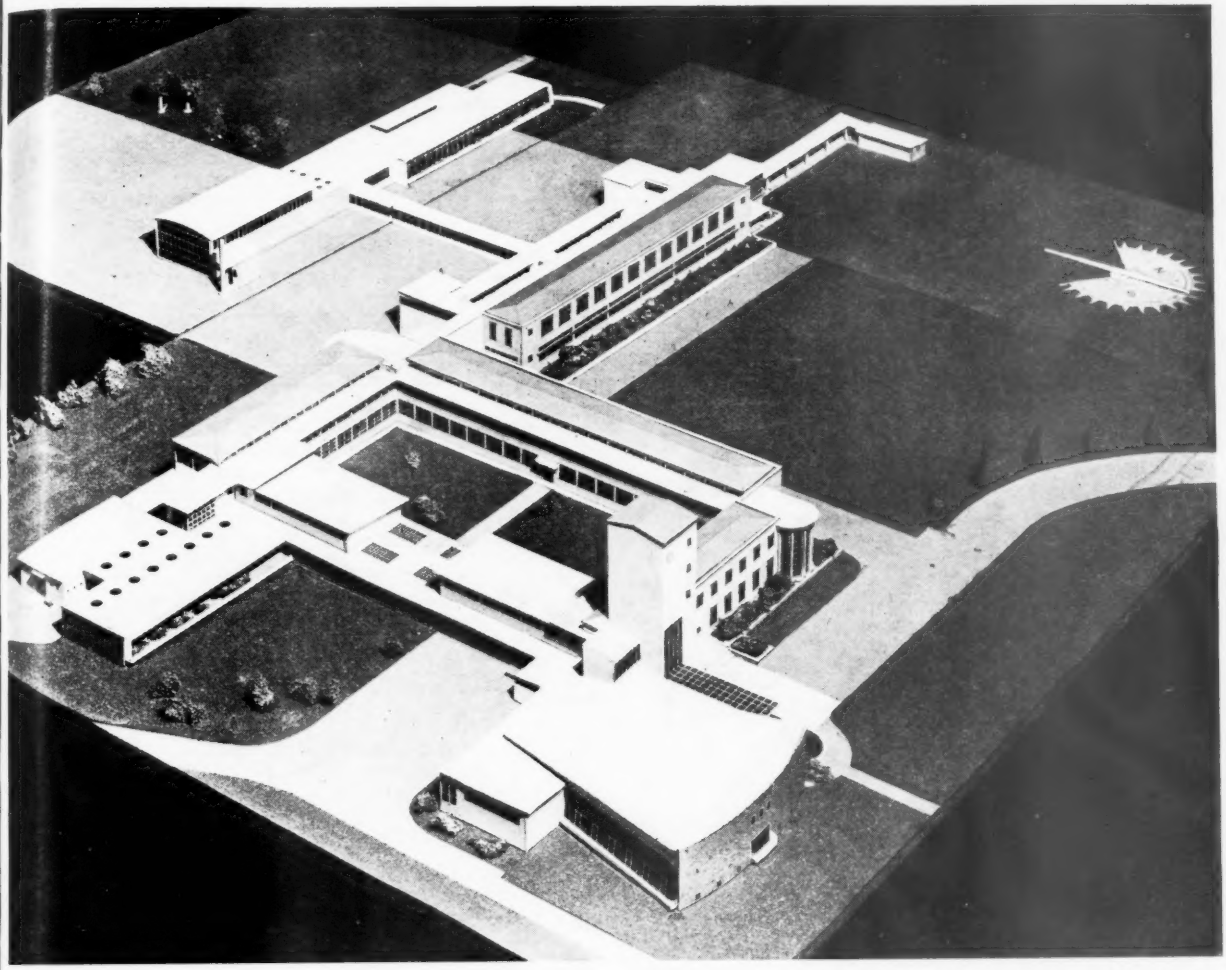
R.I.B.A. Diary

FRIDAY 22 OCTOBER 2.30 P.M. TO SATURDAY 30 OCTOBER inclusive. Harlow New Town Exhibition.

TUESDAY 26 OCTOBER 6 P.M. A.S.B. Lecture. *Recent Developments in the Pre-casting and Pre-stressing of Concrete*. L. W. Elliott [*A*], A.M.I.C.E., A.M.I.Struct.E.

TUESDAY 9 NOVEMBER 6 P.M. Inaugural General Meeting. Address by the President; Unveiling of Portrait of Sir Lancelot Keay (Past-President).

THURSDAY 18 NOVEMBER-THURSDAY 25 NOVEMBER INCLUSIVE. Exhibition of Architects' Working Drawings.



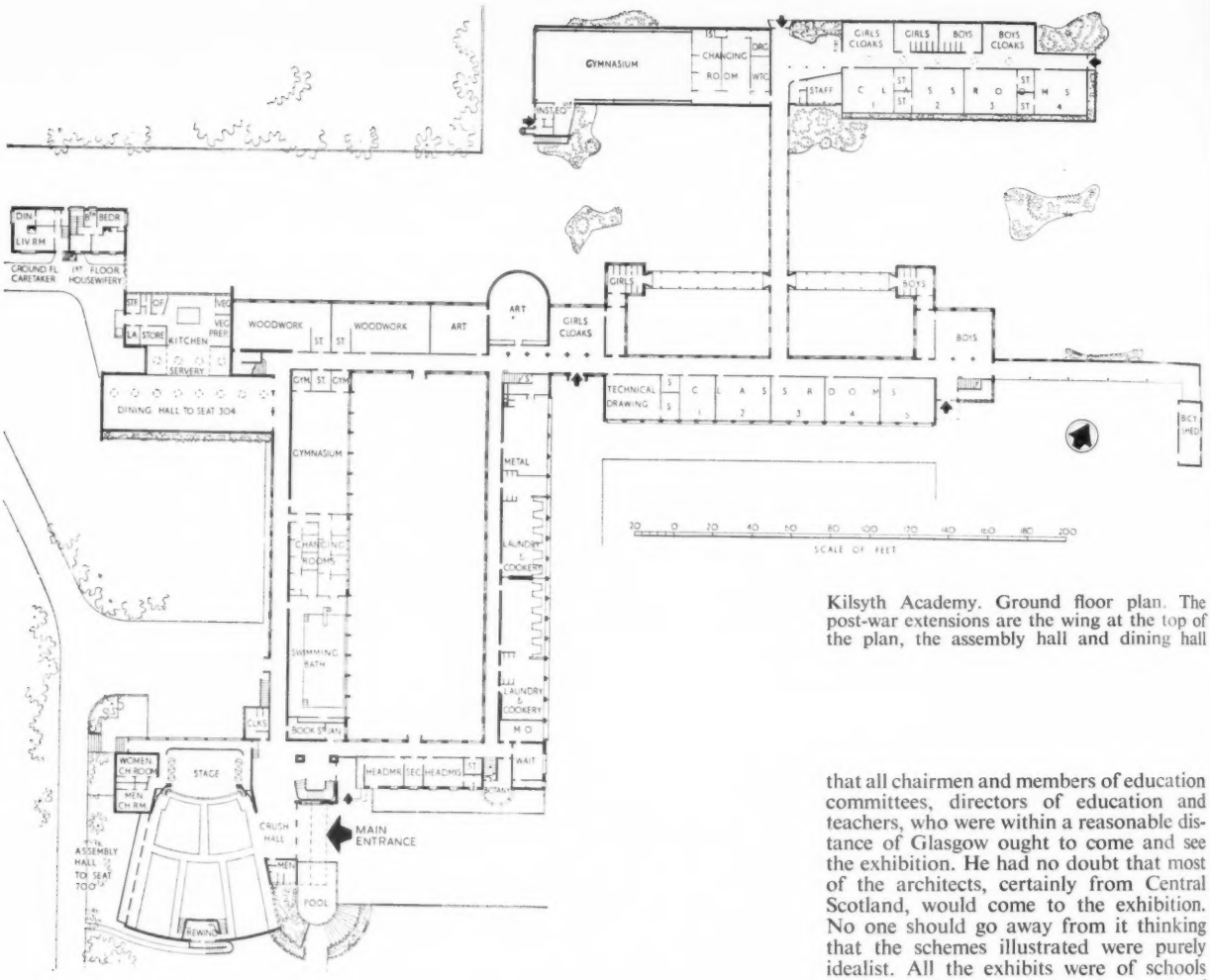
Model of Kilsyth Academy added to the Exhibition. Architect Basil Spence, O.B.E., F.R.I.A.S. [*F*]

The New Schools Exhibition in Glasgow

THE 'NEW SCHOOLS' EXHIBITION was opened on September 16 at the McLellan Galleries, Glasgow, by Mr. Tom Fraser, M.P., Parliamentary Under-Secretary of State for Scotland. The exhibition is being shown by the Scottish Committee of the Council of Industrial Design and the Royal Incorporation of Architects in Scotland. Some additions have been made to it consisting of models and drawings illustrating designs for new schools adopted for erection or in course of building by Scottish education authorities.

The principal school shown is the new Academy at Kilsyth by Mr. Basil Spence, O.B.E., F.R.I.A.S. [*F*], which is illustrated here. There are also models of a new school at Falkirk for children over 12, a model of a primary school at Linlathen, Dundee, drawings for an aluminium school near Lochore—a mining village—by the Fife County Council, the model of a primary school at Old Cumnock, Ayrshire, to accommodate 600 children, and plans of schools to be erected on bombed sites in Dumbartonshire at Clydebank and at Yoker and Dumbarton. Drawings from Edinburgh were of secondary schools at Pilton and Stenhouse, and there was also a plan for a private school in Glasgow by Mr. J. A. Coia [*F*]. Two models submitted by the Scottish Education Department illustrated the type of cookery rooms recommended for domestic science work. Each girl is made to feel that she is working in her own kitchen through the use of cupboard units, sink and a window in her section, yet each can be easily supervised by the teacher. Although it was impossible to re-erect the entire classroom which figured in the London Exhibition, representative pieces of furniture were on show.

The Hon. Lady MacGregor, O.B.E., took the chair at the opening ceremony. She gave some facts about the exhibition and the handbook, *New Schools*, and expressed pleasure at having Mr. H. V. Lobb [*F*], Chairman of the R.I.B.A. Exhibitions Sub-Committee, at the opening ceremony. Lady MacGregor said that the Scottish Committee of the Council of Industrial Design had felt it was very important that this exhibition should be brought to Scotland in order to give architects, directors of education, local authorities, furniture manufacturers and all the interests connected with education in Scotland an opportunity of seeing it. They were indebted to the R.I.B.A for lending the exhibition and to the Royal Incorporation of Architects in Scotland for

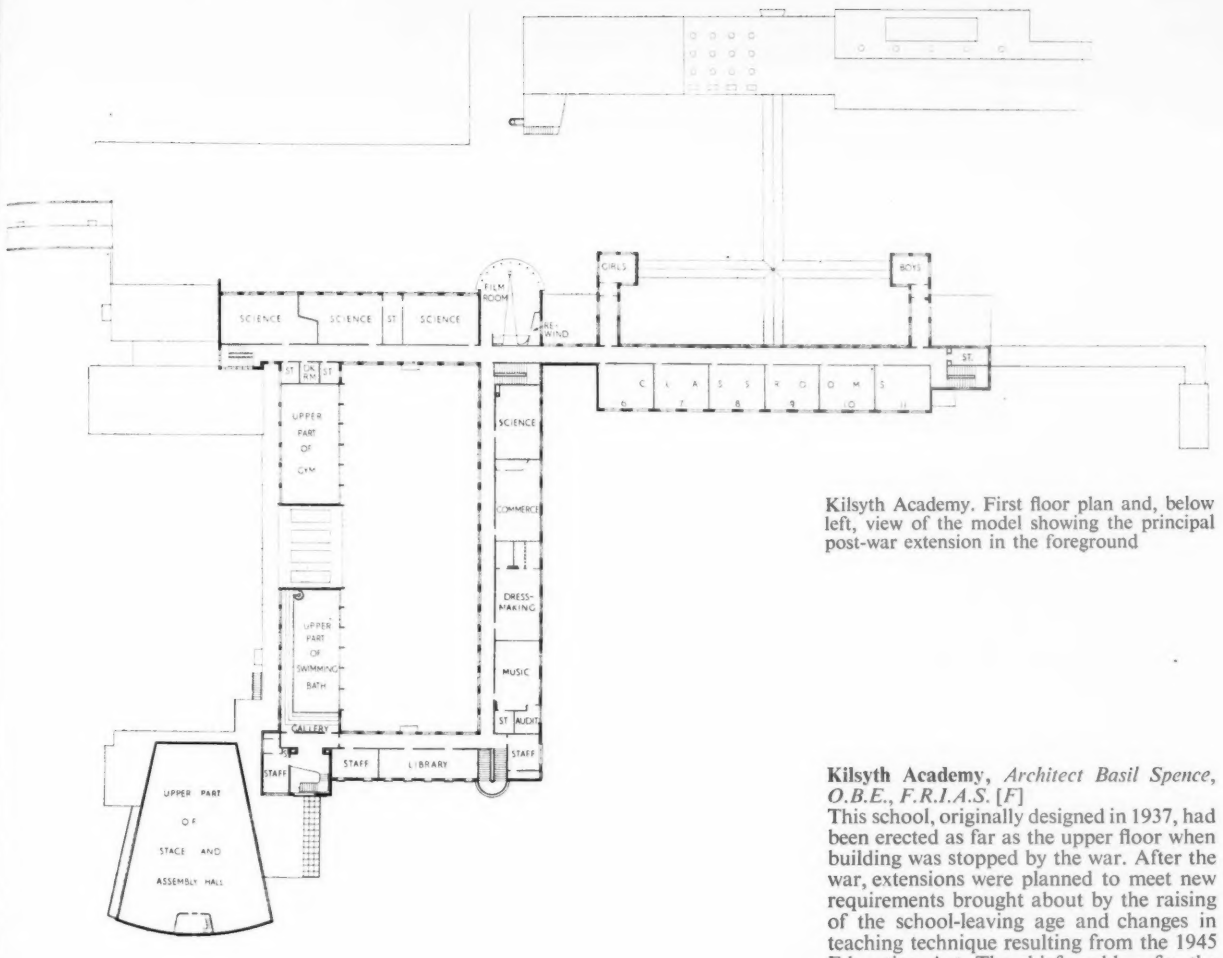


Kilsyth Academy. Ground floor plan. The post-war extensions are the wing at the top of the plan, the assembly hall and dining hall

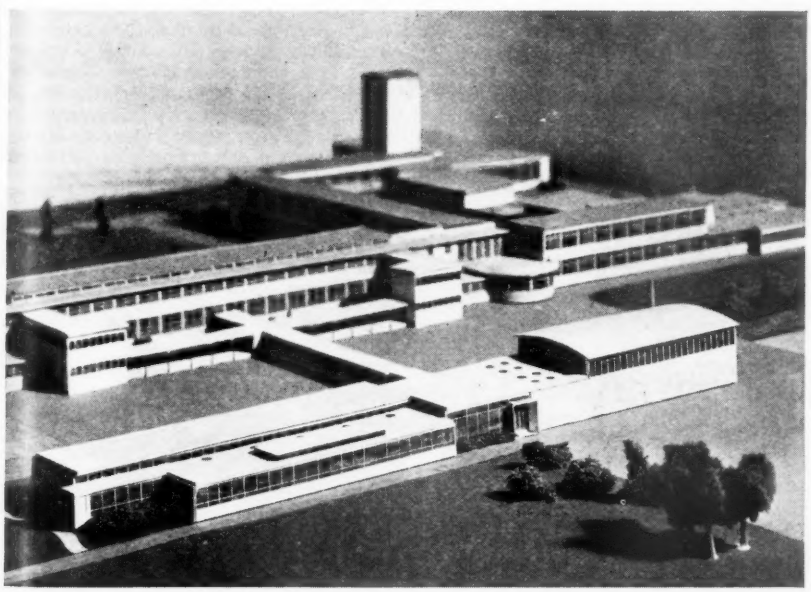
erecting it, and specially to Mr. Coia, who had given up so much time to the work. With the assistance of the Scottish Education Department, a pamphlet in the form of an insert leaflet to the *New Schools* book had been prepared; this contained a message from the Secretary of State which dealt with the problems of planning and furnishing Scottish schools.

Mr. Tom Fraser, in declaring the exhibition open, said that at the present time there were some 55 major school building projects under way in Scotland; these were in addition to the tremendous task of providing temporary buildings for the raising of the school age and for the provision of school meals; plans for buildings estimated to cost no less than £5,000,000 were under discussion. It was now clear that although traditional forms of construction would be used, newer forms involving some form of prefabrication would play an increasing part in school construction. He emphasized the changes in school design and planning, particularly as regards daylighting, which had been brought about by the different conception of education of today. The Education Act of 1945 gave the greatest scope for educational development. The possibilities were so great that many persons wondered whether, in fact, with our present resources in this country, we were within a generation going to be able to fulfil all that was promised or foreshadowed by the Act. It was clear that full realization would take many years. It was now generally conceded that education went on through life and that opportunities should be given to people of whatever age to continue in some educational pursuit or other. There were possibilities and potentialities in development of technical education; he personally would like to see a very considerable development of technical education in Scotland because it was clear that if our economic difficulties were to be overcome, workers had to be more effective technicians; improved industrial techniques would no doubt play an increasing part in our productive capacity. The task of providing accommodation for the many different education services was a formidable one, and he felt that all chairmen and members of education committees, directors of education and teachers, who were within a reasonable distance of Glasgow ought to come and see the exhibition. He had no doubt that most of the architects, certainly from Central Scotland, would come to the exhibition. No one should go away from it thinking that the schemes illustrated were purely idealist. All the exhibits were of schools that were either planned or in course of construction. In spite of difficulties, it ought to be possible to see that the new schools were good, properly situated and that sites were big enough; they should not be hurried into building schools on unsatisfactory sites or in too congested areas because, if they did so, they would regret it in time to come.

Mr. A. G. R. Mackenzie [*F*], President of the Royal Incorporation of Architects in Scotland, thanked Mr. Fraser for opening the exhibition. As representing the R.I.A.S., whose objects were to produce good architecture, he wished to express their gratitude for the encouragement which they had received from the Government in these difficult post-war years. The Royal Incorporation would always be ready to co-operate in any helpful way whether in advising on competitions for new towns in the Highlands or arranging exhibitions such as the one now opened or in any other way. Co-operation in the past had been very successful, particularly as regards housing. He would have much pleasure in conveying to the R.I.B.A. the appreciation which had been expressed of their efforts.



Kilsyth Academy. First floor plan and, below left, view of the model showing the principal post-war extension in the foreground



Kilsyth Academy, *Architect Basil Spence, O.B.E., F.R.I.A.S.* [*F*]

This school, originally designed in 1937, had been erected as far as the upper floor when building was stopped by the war. After the war, extensions were planned to meet new requirements brought about by the raising of the school-leaving age and changes in teaching technique resulting from the 1945 Education Act. The chief problem for the architect was to graft an assembly hall, a new dining hall and kitchen on to the older building, and to provide a second gymnasium and four additional classrooms. The original school was designed for 450 pupils, the new design is for 700.

Although designed in 1937, the building as originally planned is very largely in accord with present-day ideas, and consequently needed little alteration to meet the requirements of the 1945 Act. The domestic science section has the arrangement of separate units for each pupil, described above; the plan in general follows the wide spreading lines now customary which give correct orientation to each section and segregation of noisy from quiet units; part of the entrance hall, which is flanked by a pool, has glass walls with flower beds inside and outside. A sculptured concrete group, 17 ft. high, has been completed for the entrance tower. The swimming pool can be turned into an open-air pool by pushing back the windows looking on to a grass courtyard. The whole structure has a reinforced concrete frame with brick infilling. The new gymnasium is to have a roof of shell concrete, clerestory lighting and gable wall of glass.

The Work of the R.I.B.A.

Part II

THE R.I.B.A. AS A LEARNED SOCIETY

SOME READERS may wonder why this, the original function of the Royal Institute, is mentioned so late in this article. The reason is that of all the many functions of the R.I.B.A. this is the best known both to members and the general public and therefore can be almost taken for granted. Everyone who has any connection with the architectural world is well aware of Institute formal general meetings, at which both members and important guests are present, of the Annual Reception and Annual Banquet, of the Royal Gold Medal, the London Architecture Medal and the British Architects' Conference. His Majesty the King is patron; the Honorary Fellows include members of the Royal Family, peers, ecclesiastics and statesmen; the Honorary Associates are men distinguished in the realms of art, science and letters who have connection with architecture. The Honorary Corresponding Members are eminent architects in foreign countries. The Royal Gold Medal, awarded annually by the Sovereign on the recommendation of the Institute Council, is regarded all over the world as one of the greatest honours that an architect can receive.

These features of Institute life are well known and are fully reflected in the pages of the JOURNAL. They are of immense importance to architecture in this country and to its practitioners. They place the Institute in a central position in the life of the nation. Today that position is not only the cultural one that the Royal Institute has occupied almost from the date of its birth. It has also a practical aspect in that in governmental and other influential circles, architecture is being more and more regarded as a necessity in the national life and no longer as a luxury for the well-to-do.

The Royal Institute has concerned itself with public amenities from the time when it told the Government in 1846 that the placing of the Duke of Wellington's statue on the top of the archway into Green Park was 'unsatisfactory and its position there most objectionable'. Many times its opinion has been sought, or given unasked, on new buildings or suggested 'improvements'. It concerned itself with Wren's City churches when many of them were threatened with demolition; with the preservation of many historic buildings of architectural merit (a cause now much less clamant than it once was), with the Palestine Exploration Fund and with the excavations at Nineveh. It had something to say about the Thames Embankment; it condemned successfully the proposal to preserve the exhibition buildings of 1862; in later years it was a prime mover in the creation of the Council for the Preservation of Rural England and of the National Buildings Record. These are but a few of the many matters of public interest on which it has taken action as a learned society, sometimes at the request of the government of the day, sometimes in protest at an act of vandalism or 'uglification', sometimes to get done something which ought to be done. It has not always been successful, but failure in one instance has never deterred it from future action, though sometimes wisdom as to method has been learnt by experience.

SALARIED AND OFFICIAL PRACTICE

The Salaried Members' Committee

Just over twenty years ago, a few members of the Institute who were being paid by salary instead of by fee, became actively dissatisfied with the Cinderella status which, more by thoughtlessness than design, they felt they held in the profession. In due course their grievance became heard in the Council. The result was a new Committee of the Institute, called the Salaried Members' Committee, appointed by the Council with the following tasks:

1. To report to the Council from time to time upon all matters affecting the welfare of the salaried members of the R.I.B.A.
2. To form an agreed policy among members of the R.I.B.A. in relation to official salaried appointments.
3. To investigate conditions of employment, study the problems that arise and recommend such action as might benefit all ranks of the profession.

In view of the partisan discussions that have occurred about salaried and official practice, it is opportune to note that in this first institutionally organized body of salaried architects, the private practitioner was not only represented and welcomed, but his support was active and audible in the Council and the Committee.

The pioneers of the new Committee had, of course, obstacles and opposition to overcome. Its very creation probably had no parallel in other professional societies; and it is only recently, in the face of the new conditions following on the war, that other professional bodies have become aware of the special problems confronting their salaried members.

During its first ten years the Committee grew in strength; it had few teething troubles; it made its voice heard and its influence felt both inside and outside the Institute. Complaints, individual and collective, affecting salaries and conditions of service, were investigated; representations carrying the full weight of the Institute were made at the right time to the right persons; reports and recommendations were submitted to the Council; and the Bye-laws were amended to provide for a representative of the Committee to sit on the Council.

The Official Architects' Committee

Up to 1937, the Salaried Members' Committee had included senior official architects, who were heads of public departments; but with the increasing impact of their work on the community, and with the new problems that confronted them, these senior official architects began to feel that their proper standing in the profession was either ignored or not adequately recognized in the Institute. Their first organized attempt to get together and speak with one voice was the short-lived Official Architects' Association, which was formed and functioned independently of the R.I.B.A. Whether it was because of its independence of the Institute, or because its meetings were so thinly attended that neither policy could be shaped nor any telling action taken, or for whatever other reason, the Association made little headway. Its mere existence, however, revealed the danger of a schism in the Institute. It is therefore greatly to the credit of the leading members of the Association that they by diligence, loyalty and good sense sealed the ominous crack, and moved the Council to establish the Official Architects' Committee.

At first, the agenda of this Committee consisted mostly of items of particular or special interest to senior official architects; such as, for example, conditions of service governing public appointments; the status and salary of the chief architect as compared with those of other chief officers in the same service; his standing in the Institute; and questions of practice and procedure in so far as they departed from the normal and were peculiar to official appointments.

There were, however, many common grounds on which the two Committees could, and did meet jointly to discuss matters which affected all architects who were paid by salary, whether as assistant in a private or public office, whether at the top or the bottom of the hierarchy. Chief among these topics of common interest to both Committees was the ever-present desire for some unification of salaries. The Salaried Members' Committee had long been considering this question, and on their recommendations and drafting, the

first R.I.B.A. Scale of Annual Salaries was approved and published by the Council in 1930. The Scale was revised in 1937, and again in 1945; but since this last revision was based on pre-war values, it is now again on the agenda of the Salaried and Official Architects' Committee, whose formation is described below.

This Committee, with the full authority of the Council behind it, is steadily pressing forward towards its great aim of obtaining universal recognition for and adequate remuneration of salaried employment of architects in government, local authority and other offices. As each local authority office becomes ripe for reorganization so does the Committee take action towards the desired end—and with increasing success. Only persistent effort over a long time can command success—though some members, who do not always appreciate the obstacles, sometimes fail to realize this.

In 1938 the Salaried Members' Committee recommended the setting up of similar committees by all the Allied Societies. Apart from the obvious local benefits that could be gained by these local committees, it was expected that a complete network of provincial committees, all working with the same objects, and in close liaison with the headquarters Committee, would greatly enhance the effectiveness of the latter.

It was suggested that the main aims of these committees should be:

1. The advancement of architecture and unification of the profession.
2. Insistence on the policy that, for efficiency and economy, architectural work financed by public funds should be executed by qualified architects without the intervention of members of any other profession—thus helping the employment of qualified architects for all building work.
3. To obtain the general adoption of the R.I.B.A. Scale of Salaries by bringing it to the notice of all local authorities in the area, reporting to the R.I.B.A. Committee from time to time as to its reception and operation.
4. To scrutinize local public appointments, and where necessary to take action with a view to obtaining proper remuneration and conditions of employment.

Unfortunately, neither sufficient enthusiasm nor collaboration was forthcoming from the Allied Societies to carry out the scheme at that time.

The Joint Negotiating Committee on Salaries

Since the question of salaries necessarily involved every professional field of practice, the Salaried Members' Committee recognized the desirability of consultation with all ranks of the profession. Accordingly, in 1944, on their recommendation to the Council, the Joint Negtioating Committee on Salaries was formed; it consisted of three representatives each of the Salaried Members, the Official Architects, and the Practice Committees, and one representative each of the Royal Incorporation of Architects in Scotland, the Institution of Professional Civil Servants and (till January 1947) the Association of Building Technicians.

The Negotiating Officer

The next logical step to follow the Joint Negotiating Committee was a Negotiating Officer; and it was again on the recommendation of the Salaried Members' Committee that in 1946 the Council appointed a Negotiating Officer to carry out investigations into conditions of employment, status, salaries, etc., in all sections of the profession employed by salary, in all parts of the country; and to undertake responsibility for the collation and documentation of all relevant information. He investigates salary problems referred to the R.I.B.A. by members and negotiates on their behalf with employing bodies. He is also responsible for liaison with organizations allied to the R.I.B.A. and with other professional institutions concerned with salaried employment. He serves as secretary to the Salaried and Official Architects' Committee and its Sub-Committees. Since his appointment, the Negotiating Officer has prosecuted several appeals under Section 39 of the National Charter; his services in such cases are available to all members of the Institute.

The Salaried and Official Architects' Committee

While there is no doubt that the three Committees described above efficiently served the purpose for which they were constituted, it was inevitable that overlapping should occur, with the result that a certain amount of confusion resulted. It seemed, therefore, natural and desirable to merge the Committees, and this was carried out by the Council early in 1947, the present Salaried and Official Architects' Committee coming into existence. The new Committee has an Executive Committee (which has co-opted members of the Practice Committee and the Royal Incorporation of Architects in Scotland and the Institution of Professional Civil Servants) and sub-committees to represent the different spheres of activities of salaried members. The Committee is represented on the Council by two members.

Salaried employment of architects has greatly increased in recent years. Conditions of employment need continuous watching and often the exercise of considerable pressure to maintain a proper status for architects—and, indeed, proper consideration of architecture—on the public bodies responsible. To be fully effective such pressure needs the weight of a united profession behind it. Therefore the importance of developing the work of the Salaried and Official Architects' Committee to the utmost point of usefulness can hardly be exaggerated.

It would be invidious, even if it were possible, to assign the credit of any of the measurable advancements made in the interests of the salaried architect since the end of the war exclusively to any one of the Committees here discusssed: they have always collaborated; and under their direction and guidance the Institute has taken every opportunity of representing its members, collectively and individually, in all questions affecting their salary, status, and conditions of service, with their employing authorities. No sensational success can be claimed; only a firm steady progress, which, however, does not seem to satisfy some impatient members. The business of salary negotiation is technical, laborious, slow and complicated.

Briefly, the main objects of the Salaried and Official Architects' Committee are (1) to protect and improve the interests and standing of the salaried architect in every field of professional practice; and (2) to promote his efficiency and skill. The Committee provides the machinery to deal with all grievances which have any substance, and to carry out any policy of reform that is based on sound principles. Its work is external and internal. On the external side it is in a position to use the great prestige and authority and the widespread organization of the R.I.B.A. to advance in every practical and desirable way the legitimate interests of salaried members as a class. On the internal side it can greatly develop its efficiency by improving the representative character of the whole of the organization of the R.I.B.A. and the Allied Societies. It is a fact which is not always realized, or when realized reluctantly accepted, that the greater volume of the architectural work in the country is carried out by architects who are paid by salary, whether in a private office or a public department. They form the majority of the profession, and without them no office could function. It is the aim and responsibility of the Salaried and Official Architects' Committee to defend and promote their interests; its services are readily given to any member who seeks them.

SCIENCE AND TECHNOLOGY IN ARCHITECTURE

The Science Standing Committee

Before the last war the scientific and technical side of the Royal Institute's business was in the charge of the Science Standing Committee. The Committee, while taking an active interest in the comparatively young science of building research, dealt mostly with routine matters such as representation of the R.I.B.A. on external committees, notably those of the British Standards Institution. It did not itself undertake or promote research though it had to its credit, among other similar efforts, a strong influence on the starting of scientific fire research in this country.

Late in 1939, the President, Mr. Stanley Hall, with the architect's instinct for long term planning and at a time when the nation was just realizing the tremendous power that lies in the scientific approach to problems, invited about half a dozen members of the Institute to discuss with a similar number of scientists at the Building Research Station the possibilities of creating stronger ties of understanding between the profession and the scientific research world. It was felt that architecture was not benefiting as it could from scientific research, partly because most architects lacked the special training and attitude of mind necessary to state problems in scien-

tific terms and to apply research findings, while the scientist often had too narrow a view of the complex problems which more and more beset the architect. And so the President R.I.B.A. and the Director of Building Research met in conference attended by architects in private practice, scientists engaged on building research and architects and scientists who were working on war-time study of structural problems in the Research and Experiments Department of the Ministry of Home Security.

The meeting had specially in view the fact that architecture was entering a new phase of its service to the nation. Not only was the technique of building changing rapidly under the impact of new materials and methods, but the whole approach to it was likely to be affected after the war by the work of the sociologist, statistician, physicist and structural engineer—to mention only some of the more important influences. If the architect was to retain his proper place as chief technician in the conception, design (including planning) and control of building projects he had to be able to co-operate with scientists so that both parties could understand what the other meant and did.

The Architectural Science Group.

From this meeting in December 1939 the Architectural Science Group emerged immediately. It consisted of architects, surveyors, scientists, teachers, doctors and sociologists, in other words both members and non-members of the Royal Institute who had knowledge to contribute towards the formulation of a scientific approach to architecture. The R.I.B.A. agreed to pay the Group's running expenses and the Building Research Station and Ministry of Home Security offered knowledge and advice so far as war work and military secrets permitted. The Group consisted of four main technical committees: (1) Sociological, (2) Building Needs, (3) Education, (4) Economics. These were knit together by a Co-ordinating Committee.

One of the results of papers written and discussions held was the evolution of a basis by which standards of definite performance in materials and structural elements are now replacing the old empirical rule-of-thumb building laws. The natural economy which has resulted from two world wars now dismisses 'hit or miss' designing as a wicked waste of depleted natural resources. The new sociological approach to the planning of houses and of new post-war communities to meet the higher standards demanded by the public conscience, has meant an ever-increasing appreciation of the value of the architect. A well-founded education is the spring from which all best endeavour flows. The Group was most conscious that all talk of æsthetic and scientific co-operation would be inoperative unless the architect has in the future more scientific training than he used to have. There are so many things that an architect ought to know that it is very difficult to arrive at a balanced curriculum for a three- or five-year course which will still ensure that his æsthetic sense is fully developed. The Group's two papers (1) *The Place of Science in Architectural Education*, (2) *The Teaching of Construction*, have been published, and their findings have been studied by the schools of architecture and many of the recommendations have been adopted, notably by one of the best known of the recognized schools. Although not officially published by the Institute, papers by the Economics Committee on *Proper Particulars* and documents from the Sociological Committee have been used by many important authorities as a basis for the new approach to architectural and building organization which improved post-war standards are expecting.

Creation of the Board

Under the influence of another President, Mr. W. H. Ansell, the work of the Group was given official recognition by the Council, the Architectural Science Board being officially constituted in September 1942 as a part of Institute organization. It should be noted that during the war the work of the Science Standing Committee had been unavoidably suspended. The work started by the Group was taken over together with the membership of architects, scientists and other specialists, the value of the mixed personnel having been clearly demonstrated in the two previous years. The Board consists of 25 members who meet quarterly to review and inspire the work of its various study committees. Since the end of the war the work previously undertaken by the Science Standing Committee has also been carried on by the Board.

In describing the work of the Board it should be first stated that the Board does not subscribe to the heresy that scientific method could ever be a substitute for the accepted architectural approach. The Board's terms of reference: 'To promote the use and facilitate the acquirement of science in the advancement of architecture' is fully in line with the terms of the Institute's Royal Charter quoted in Part I of this article, and they show clearly that the Board's work is subsidiary to the creative art of architecture. Though subsidiary, this work is indispensable in providing scientific data on building which keep the architect's creative work both virile and acceptable to a building public whose demands are becoming more and more discerning and whose standards are steadily rising.

The Board does not undertake laboratory research but it keeps the whole field of building technique under constant review. Through the medium of its lectures, published in full in the JOURNAL it brings to the notice of architects and other technicians the result of the latest scientific knowledge on the many activities connected with building. These lectures are delivered by recognized authorities and are purposely not 'popular' in their presentation. The work of the B.S.I. in the preparation of British Standards is under constant consideration by the Board's Standard Specifications Committee, composed of all the R.I.B.A. representatives on B.S. drafting Committees. This is an increasingly important field of responsibility and activity because the R.I.B.A. representative on a British Standards drafting committee really represents the consumer, i.e., the receiving end of a Standard set of conditions which may prove to have an important effect on architecture and indeed on everyday life. The interchange of experiences and the shaping of common action which goes on in this particular committee is an excellent example of public service on behalf of the Institute. In this work the Board has been mindful of its creed that the designer is paramount; at its instigation the British Standards Institution and the Codes of Practice Committee have agreed to the principle that any standardization of æsthetic design is not desirable.

Among the tasks that the Board has set itself are: investigation as to how far scientific method can be applied to the ascertainment and control of building costs; consideration of dimensional standardization; study of scientific work by bodies outside the building industry and building research proper which may affect the status and practice of architecture; the revision of bye-laws. The field observer scheme now operated by the Building Research Station and recently announced in the JOURNAL, originated from a scheme prepared by the Architectural Science Board.

THE R.I.B.A. LIBRARY

Growth of the Library

The R.I.B.A. Library started with the foundation of the Institute in 1834; its existence and maintenance has always been regarded and accepted as one of the Institute's essential duties. At first it was a small collection of books available only to London members; it grew, in the early years, mainly by the gifts and bequests of members and friends of the young Institute. Amongst the books of the present library will be found copies bearing on the end-papers the names of most of our well-known 19th century architects, alongside the gifts of many foreign scholars and architects.

In 1899, the library was less than one-third its present size and was housed in the Conduit Street premises, where it outgrew the available space long before the move to Portland Place. The library rooms in the new building were specially designed and when the building was opened in 1934 there was ample room for the collections. Much has happened since then; much expansion and natural growth; the war years, with dispersal of all possessions of value and temporary accommodation; the return to the library rooms on the third and fourth floors; reorganization and expansion into the rooms of No. 68. All these happenings, fortunate and otherwise, have been watched and controlled by successive Library Committees and the present committee already realizes that while there may be space for the library adequate to meet the demands of the next five or six years, there is a need now for long-term plans to provide for even the current rate of expansion.

The Institute as owner and administrator of what is now the largest, most complete and certainly the best-known special architectural library in the world, has a great responsibility; not only to its members, but

to all those who look to the Library as an instrument of research and as a centre of architectural culture and learning.

Organization and Working

The Library Committee is appointed by the Council to administer all matters connected with the library, including staff and equipment; it meets each month throughout the year. Two sub-committees are appointed and these also meet each month; one is concerned with accessions of books and manuscripts (including theses for the final examination), with binding and repairs and the purchase and exchange of periodicals; the other sub-committee deals with the drawings and engravings, accessions to this collection and with its repair and maintenance. The Library Committee appoints representatives to the National Panel of the B.S.I. on Classification (U.D.C., classes 69, 71, 72 and 73) and, as required, to other outside bodies.

The Library Committee aims always at strengthening the collections to provide the most useful possible source-centre for practising architects, architectural students, research scholars and the interested layman. It is, however, under no complacent impression that the Library, as it now exists, has no need for improvements. Many of these will extend into the future, they can only be accomplished by the application of long-term policies. One of the largest pieces of work, since the making of the pre-war printed catalogue, was started this year—the reclassification and card-indexing of the drawings and engravings collection. So far only the early items have been studied in detail, but in a few months time a draft index down to the year 1830 will be ready for use. If it is remembered that the total collection in this section of the Library amounts to well over 10,000 items, many of which, being sketch-books or sets and comprise many sheets, the task can be visualized.

In the books section of the Library, the committee are planning an intensive and analytical review of each subject class, through the agency of specially appointed small *ad hoc* sub-committees. In this way it is hoped to build up lists of all important works not yet included in the collections. These lists will be added to from time to time and will form a 'wants' list of early works, out-of-print books and foreign books to assist all future committees to acquire the works listed as they appear on dealer's shelves or in book sales. New books are more easily coped with, though many difficulties exist at the moment with regard to the purchase and import of foreign books. Suggestions from users of the Library are always welcomed by the Committee; they should be made to the Librarian, in writing. The problems of binding and rebinding, intensified since the war by shortages of materials and labour, are now being gradually overcome and the large arrears will, it is hoped, be made up at a gradually increasing rate. Changes are to be made in the general layout of the Periodicals Gallery during the next year to assist easy reference and the work of the staff in this section.

We would refer readers to an article in the JOURNAL of September 1946 for a general description of the main divisions of the Library and in doing so refer again to the LIBRARY BULLETIN, which then was newly announced. This quarterly publication, though still restricted in content by paper restriction, has been a great success; its present circulation is nearly 2,000 per issue and apart from the many members who have applied for and receive it, the BULLETIN goes to many British, Foreign and Dominion libraries, architectural schools and societies; it is proving of great use in these many contacts and in many other ways. Another matter receiving constant attention as post-war needs develop is the revision and republishing of the Library's special bibliographies on various types of building and subject. These bibliographies are available in the Library or by post.

Some Treasures

The treasures of the Library are less known than they should be, even among members of the Institute. Space permits a random reference only to a few outstanding items. We would select from the manuscripts, Sir Christopher Wren's contract documents (283 pages, sm. fo.) for Winchester Palace (1683); from the books we must note the fine examples of the works of Vitruvius and Serlio, Scamozzi, Vignola, Palladio and Piranesi: the Institute possesses many first editions and what is probably the most representative collection of these early works in the country. Then there is John Shute's book, the first English book on architecture (1563); the Institute possesses the best of the five known copies. Above all is the Heirloom copy of Wren's Parentalia, which is interleaved with his original letters to his wife and son and many other family and personal records. The Library also has a copy of Alberti's *De Re Aedificatoria* (1485), probably the first printed book on architecture; a rare first edition of Sarayna's *De Origine et amplitudine civitatis Veronae* (1540), and a copy of John Stow's *Survey of London* (1598). The later historical, technical, architectural and town planning books probably are better known, if only because they are contemporary or in greater use; even here, however, there are many works of great intrinsic value by reason of rarity, illustrations or bindings.

In the Drawings Collection there are the great Burlington-Devonshire and Salvin collections, held by the Institute in Trust from the Dukes of Devonshire since 1894, with the seventeen volumes of examples of the drawings of Palladio, of Inigo Jones and John Webb. There is also the so-called 'Smithson' collection of 164 English architectural drawings dating from 1599–1632 and the 'Drummond-Stewart' collection of 17th century drawings. Amongst many other drawings and water-colours must be noted the 'perspectives' of all dates with the work of more recent architects of the 19th and 20th centuries; the latter are being gradually acquired, often by generous gifts and bequests, to become the treasures and historical records of the future.

During the last year a Library Group has come into being; it is a self-governing body formed to further the aims of the R.I.B.A. Library and to increase both professional and lay interest in its work and possessions. The Group meets each month, generally at the R.I.B.A., and conducts informal talks on subjects of bibliographical and topographical interest. Its successful first year promises well for the future; there is room for new members.

Use of the Library

Statistics are dull, but in order to show the extent of the Library and its work we append a few outstanding figures for the last year: the number of attendances of readers was over 12,000; this is almost equivalent to the full membership of the Institute (including Students R.I.B.A.). Nearly 17,000 books were issued on loan and 3,000 of these went through the post. No record of enquiries by letter, telephone or over the issuing desk is kept, but they are in the region of 40–50 a day throughout the year. The Library possesses well over 60,000 books and receives 130 architectural and technical periodicals from all parts of the world. The present staff numbers twelve; it is augmented from time to time by voluntary and temporary assistance.

The Library is open from 10 a.m. to 7 p.m. each weekday except Saturdays when it closes at 5 p.m. until Monday morning. It can be used by all members of the Institute without formality, by all *bona fide* students upon proper application to the Librarian, and by non-members through the issue of reader's and borrower's tickets (and the payment of a fee); the application forms for these tickets may be obtained on request in the Library.

THE R.I.B.A. JOURNAL

The Journal in the Past

The Institute of Architects published the first issue of its TRANSACTIONS in 1836. The contents were the papers read in the first and second sessions of the Institute which had been published separately as PROCEEDINGS. Among these papers was one by George Godwin with the strikingly modern title: *The Nature and Properties of Concrete and its application to Construction up to the present time.* The two series of publications continued their separate existence up to 1893, though both underwent an ambitious change in the style of production in 1885.

With Volume 1 of the 'Third Series' (words which are to be seen on the present cover) the two publications were amalgamated as THE ARCHITECTURAL JOURNAL, BEING THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS, a title which was retained until 1933, though the short title R.I.B.A. JOURNAL had been in current use for many years. The amalgamation was welcomed by members and resulted in some economy which, however, was soon dissipated in later issues by the increasing number of pages, though this in turn was met by greater advertising revenue. At the same time, a 'Sub-Editor and Publications Clerk' was appointed under the direction of the Secretary who up to now had been the Editor. From 1921 to 1946 the editorship was held by the Librarian-Editor, several

changes being made during this period, notably one in 1931 when the new badge by Eric Gill appeared on the cover and the internal typography and layout were revised by Stanley Morison. A part-time Technical Editor was appointed in 1933. Since January 1946 the JOURNAL has been in charge of an Editor with separate staff; the JOURNAL has again been re-styled and a more progressive policy adopted.

Changes of these kinds have something of an air of inevitability at the time when they are made. They result from some degree of indirect pressure of public opinion among members—often implied rather than expressed—that some sort of change is needed to render the JOURNAL a more lively and useful reflection of Institute current activities and of the architectural outlook of the time. Finality in outlook or presentation can never be reached; fresh changes in the future will come at appropriate times.

The Journal of today

The functions of the JOURNAL are peculiar and quite different from those of the trade periodicals for which it is in no sense a substitute or competitor. First it is a record of Institute proceedings—of the papers read at General Meetings, of other lectures and of reports of conferences, etc. Also it is a field for the publication of contributed articles on a wide variety of subjects, many by members; these articles and the sessional papers are much used for reference not only in this country but also abroad where Britain's leading position in town planning, housing and building research is accepted, with the result that articles on these subjects are much quoted in foreign technical periodicals. In recent years it has also tried to reflect to some extent technical progress in architecture and architectural practice, though these features at present are much curtailed by the paper ration. Finally, it contains the official matter which, under the Bye-laws, has to be circulated to members. The JOURNAL is therefore the principal link between members and their central organization and it is, in addition, a pool of information to which members contribute and from which they draw.

The JOURNAL is non profit-making. The advertisement revenue about balances the cost of printing and paper but not of postage. The number of advertisement pages is strictly limited and for many years past there has been a queue of would-be advertisers. Only firms of recognized standing in the Building Industry are accepted. Many advertisers are of long standing; some firms who started to advertise in 1894 are continuing today. Though no census has ever been made, there is abundant evidence that members consult and rely upon the advertisement pages. Consequently, the advertisement pages do form a real service to members.

At the beginning of the 19th century only a few hundred copies of the PROCEEDINGS and TRANSACTIONS were printed. By 1886 it was reported that 1,500 volumes of the TRANSACTIONS were issued annually, the membership of the Institute being slightly over 1,000. In 1900 the circulation had risen to 2,117 and at the time of the Centenary in 1935 it was 10,000. Today it is 15,950 and will be about 16,500 by the end of 1948. From about 1900 to 1939 (excluding the war years 1914–18) 20 numbers were published annually, that is to say, twice monthly in the session and monthly in the long vacation. During the second war publication again was monthly, and since then it has not been possible to increase this figure. The reason is, of course, the rationing of paper. Rationing is based on pre-war consumption, and though learned societies have recently been granted an increase, no allowance is made by Paper Control for growth of membership. Because the membership of the R.I.B.A. today is about 25 per cent more than it was before the war, this restricts considerably the scope of the JOURNAL and has postponed a return to the old fortnightly publication.

The JOURNAL started the post-war period with high hopes and ambitious aims towards becoming of much greater service to members than previously; a programme of development was proceeding according to plan when the fuel crisis occurred in the spring of 1947—followed at once by a cut of 40 per cent in the paper ration. At the same time Institute activities (which must be reported) have grown and continue to take up more and more of the limited space available; unanticipated steep rises in the cost of printing and paper have also occurred; further major developments are therefore halted for the moment. Nevertheless, the plan for the future provides for fortnightly issues throughout the year.

PUBLIC RELATIONS

So far this article has dealt mainly with the internal activities of the Institute. But all such activities affect not only architects but also clients and potential clients, members of other professions, local and government authorities—in fact all classes which go to make up the general public. Conversely, many corporate activities of these bodies also have their effect on the work of the Institute. It is in the impact of these two sides that the whole field of public relations can be found. When the Public Relations Committee was appointed by the Council in 1933, it was not a 'new-fangled idea' but rather a natural growth, as much the result of an internal as an external demand. The public on the one hand, largely through the agency of the press, were anxious for more information on certain practical aspects of architecture, such as housing, town planning and school design, though there was also a notable growth of interest in architecture as an art; in fact, architecture became 'news'. On the other hand, within the membership of the Institute there was a band of enthusiasts who saw, and wanted to seize, the opportunity of putting to the public the view that architecture was a public service and that the many activities of the Institute were to that end.

Public relations is a two-way business and is as much concerned with reception by the Institute of public reaction to architectural matters as it is with the public acceptance of an increased interest and appreciation of architecture. Before the formation of the Public Relations Committee, such public relations problems as arose were passed to one of the standing committees then functioning. Many problems arising failed to come within the then defined scope of the committees and in the early days of the Public Relations Committee it was quite surprising what appeared as a result on its agenda! And so the Public Relations Committee spent its early days tackling many strange problems and gradually determining, mostly by experience, principles and procedure suitable to the Royal Institute and to its task, a task rather different from other forms of propaganda or public education—call it what you will.

Perhaps, naturally, many of the early suggested experiments in public relations were not received wholeheartedly by the Council. A new Committee, with new ideas in an untried sphere, had to justify its sometimes apparently rather revolutionary suggestions before wholehearted acceptance by the Council; and it is perhaps only in the period since the War that this early suspicion has been fully allayed.

Early in its life the Committee decided that it would take at least 30 years to create a public which had reasonably sound architectural viewpoints, but that there were numerous short term objectives which could be attacked. Public relations activities have therefore from the start divided themselves into short term and long term programmes. The short term activities included such items as exhibitions, publicity in connection with the Royal Gold Medal award, 'staff work' for a deputation to a Ministry on some point of public policy, and providing information on demand to the Press. Before the appointment of the Negotiating Officer the Committee initiated action in some instances towards the separation of architects' departments in local authority staffs from those of engineers.

The early work of public relations has, however, produced certain fundamental principles which are the basis of work today. One of these principles is that propaganda must be primarily for architecture. While some propaganda for the profession as a whole is inevitable by implication, it must never appear as advertisement for individual architects. The public is not really concerned with the well-being of the profession as such or even with an art, but it is becoming more and more interested in the kinds of houses, schools and public buildings which it gets for its use. The Institute regards architecture as a public service, and architects as the ministrants of that service, the people who in fact can 'deliver the goods' required in these directions as can no other technicians.

The Council also realize that the results of public relations activities are almost never measurable. One cannot mark off achievements year by year. One can only look back after several years and compare the 'then and now' positions. Anyone who does this cannot help but be struck by the immense change for the better which has

come over the attitude of the public and Government towards architecture and architects since 1933. The Council can well claim that while this satisfactory state of affairs may not be entirely the result of the work on the public relations side, the ten years of this work (excluding the war years) have been a material factor in it.

There is also still an immense amount of public ignorance and apathy to overcome. Most people agree that since the patronage of architecture passed out of the hands of an enlightened and educated aristocracy in the 18th century, architects have had to fight an uphill battle with a clientele which in the main has been ignorant or apathetic. While architects appreciate fully and can visualize the boundless influence for good which could be given to the nation by a true architectural environment, the general public do not, though they are beginning to do so.

Exhibitions

Following the exhibition 'International Architecture' which was shown at the Centenary in 1934, the Council set up a special exhibition section. This section ran a succession of touring exhibitions which were first shown at the Institute. These were prepared at remarkably little cost owing to the employment of voluntary effort. They had a steadily growing success up to the outbreak of war, and it was never possible to meet all demands made for exhibitions, particularly in the provinces. They were a powerful long term method of public education in architecture and attracted a steadily growing public attendance and press attention. In January 1946 the Council amalgamated the exhibition section with public relations.

Apart from the annual exhibitions such as 'Building Now' and 'New Schools', exhibitions have been offered by foreign countries and outside bodies, while the British Council has requested the Institute to provide travelling exhibitions, notably those on Town Planning, for touring to foreign countries and on British Post-War Building for the UNESCO Conference. At present, the demand for exhibitions is still growing and the supply is limited only by the Institute's capacity to produce them. In this connection, it may be worth pointing out that the large number of propaganda exhibitions sponsored by Government departments during and immediately after the war has raised the standard of exhibition presentation so that it now costs considerably more to produce an exhibition of contemporary standard than of the standard required before the war.

Architecture and the Public

Besides the actual viewing of buildings of architectural merit, items of architectural interest come before the public of the present day in the form of daily and weekly newspapers, technical books, and even novels, from the spoken word on the B.B.C., and the visual form of the film, and also in television. This large field is reflected in the extent to which the sponsors of all these activities approach the Institute for information and help. The occasional contact with the Press of the early days has now grown to the volume of requests which are a daily occurrence.

The Written and the Spoken Word

In this particular sphere, it is essential that the Institute be of service. A B.B.C. official wants a feature, a journalist a story; each has some idea of what he wants and expert knowledge of what he can or cannot put across. What he seeks is guidance and information in the formation of his feature or story, perhaps merely to get certain technical points right. Journalists vary, some are very knowledgeable, some not so knowledgeable. Some want a stick with which to beat the Government, others a prop to support it. Fortunately the majority want a straight story. The Public Relations Department can only supply facts and endeavour to put across a right architectural viewpoint, avoiding being led into partisan warfare. Frequently a journalist asks for the Institute's views on some controversy which has become topical news. The journalist often expects a firm and immediate statement on one side or the other, forgetting that in an Institute with such a wide membership the width and divergence of views among its own members usually preclude the possibility of a specific stand. Further, the decision to take sides is one which only the Council can take and, by the time a decision by the Council is obtained, the subject has probably ceased to interest the enquirer.

The Institute maintains a watch on the Press, both daily, weekly and technical, in order to ensure that the full facts of any case are available to the public, and in order so far as possible to avoid one-sided presentation.

Films

Both architecture and the technics of building have recently been the subject of a considerable number of documentary and instructional films. That many of these have not been the success they might is perhaps due to the lack of appreciation by the sponsors that architecture is a technical subject and must be approached accordingly. It is not the aim of the Institute to produce such films themselves, since the production of films is, at least at present, outside the financial resources of the Institute, but the extent to which the help and advice which has been given to film sponsors has been appreciated may perhaps be measured by the growing frequency of such contacts. Nor has this been confined only to documentary and instructional films. A company which is producing an entertainment film in which the hero is an architect, wanted details of the post-war life of a typical architect demobilized from the Forces. A member was found who fitted in age and experience with the story of the film. He gave the producer long and detailed accounts of his difficulties and achievements, for which the producer expressed himself as extremely grateful and said that it had prevented him making several mistakes and given his story reality. The reasonably correct portrayal of the typical architect is a matter of concern to the Institute, and such a case as a recent radio play in which the architect was depicted as being unable to speak the Kings' English is perhaps unfortunate, and, it is hoped, does not represent the author's real typification of the architect! Perhaps the B.B.C. had as many irate letters from architects as did the Institute.

The chief aim of the film side of the Institute's activities is to raise the standard of films in which architecture or building is featured, to help avoid technical inaccuracies, to be able to inform would-be sponsors of subjects on which a film is required and to provide to enquirers information on suitable films for their purpose. As a result of the latter aim a survey has been made, and is continuing, of all existing films which have an architectural subject, whether for technical or lay audiences. Arrangements are made with various companies for the film to be seen and appraised by a viewing panel. This is work which takes up a great deal of time of the members concerned but is of value both in dealing with requests for information on films from inside and outside the profession and also as setting the standard by which future productions can be judged, particularly in their technical aspect. The results of this activity can be seen in the short notes and appraisals on certain films which have recently begun to appear in the JOURNAL.

Lectures

The number of societies and institutions which are keen to have lectures on architectural subjects is astonishing. A single request may involve telephoning to numerous lecturers to find one who is able to lecture on the date and in the place required. This section of public relations work involves the Public Relations Department in a great deal of elaborately-detailed work, and so far as the organization of lectures in the provinces is concerned, the Institute is seeking to decentralize it as much as possible to the Allied Societies, some of whom are already very active in this field. As a point of principle, the Institute consider that a lecturer ought always to be paid a fee and expenses except in the case of charitable institutions or bodies such as boys' clubs.

During the war a large number of lectures were given by members to service units, often at great personal inconvenience to the lecturers concerned. The Institute and Allied Societies could do with a very much larger number of good lecturers on their records, but it is perhaps desirable to stress that whereas one good lecturer may create an ever growing interest in the subject, a poor lecturer may cause his unfortunate audience to lose any further interest. Particularly in lectures to schools is the Institute able to tackle the long term programme of teaching some architectural appreciation at an early age. The use of visual aids in this connection is being studied.

Personal Contacts

An important aspect of public relations for architecture is that of individual action representations to Government officials and others in positions of authority. This

work is almost entirely undertaken by the President and Council who, by means of advice, sometimes asked for and sometimes not, give Ministers and others the views of the profession. Personalities enter into this, and members should realize that they owe a very great debt of gratitude to the three men who have filled the office of President during recent years. It is largely to them that we owe the entirely changed attitude of Ministers of the Crown towards architecture and architects which has occurred in recent years. Much of this work is necessarily confidential or at any rate is the prerogative of the Minister concerned to announce or not as he chooses, which is the reason why members often cannot be told about such actions at the time and sometimes not at all. The Council have long realized that public onslaughts on Ministers of the Crown generally provoke defensive opposition; it is better policy to offer helpful advice in the difficult tasks which face any Government today.

In this category of personal contacts must also be included individual action with members of the Press. Journalists are encouraged to look to the Institute for any help and advice that can be given and to call and discuss, officially or unofficially, any subject in which they are interested. By such personal contact the Institute and the Press are able to appreciate the requirements, the difficulties and the limitations on each side.

Cost

It is the generally accepted view of those Government and commercial bodies which undertake propaganda that it costs money —usually very considerable annual sums. That the R.I.B.A. has achieved quite notable results with a negligible expenditure is due mainly to the fact that it substitutes voluntary efforts of members for paid publicity experts. Even if a heavy expenditure on outside experts were possible, the employment of the usual publicity methods are, in the long run, less satisfactory than are efforts by members themselves. 'Every member a propagandist for architecture' is one of the aims of the Institute.

Already some Allied Societies are beginning to undertake in their local sphere similar work to the public relations work undertaken at the Institute on a more national basis. This local work is of great importance, particularly today when it is in the local press rather than the national press that most room is found for items of architectural interest and criticism, and in local affairs that most of today's architectural controversies are discussed.

THE R.I.B.A. AND OTHER BODIES

Relations between the R.I.B.A. and some other professional and industrial organizations have been mentioned earlier in this article, notably A.R.C.U.K., the Joint Contracts Tribunal, the British Standards Institution, the Council for the Preservation of Rural England and others. Members who are interested can find in the Annual Report a list of the many bodies to which the Council appoints representatives of the R.I.B.A. Some, however, may be specially mentioned here.

The Building Industries National Council was created, at the instigation of the late Sir Raymond Unwin, during the 1930–33 depression to make collective representation to the government on matters concerning the building industry as a whole. It consists of representatives of the R.I.B.A., Royal Institution of Chartered Surveyors, National Federation of Building Trades Employers and the National Federation of Building Trades Operatives.

B.I.N.C. should not be confused with the National Joint Council for the Building Industry which is concerned with the wages and conditions of operatives. This body was created some 27 years ago to overcome the plague of strikes and lockouts which was then convulsing the industry. So successful has it been that there has not been a single strike or lockout of any size since its creation; it is indeed a model of how good relations between capital and labour can be achieved. The R.I.B.A. is not represented on it but gives the use of the R.I.B.A. building as 'neutral ground' on which the representatives of the employers and operatives can meet.

Good relations with other sections of the building industry are also ensured by other joint committees which deal with what might be termed 'unilateral' problems. These committees include the Joint Committee of Architects and Quantity Surveyors, the Joint Consultative Committee of Architects and Builders and the Joint Committee of London Architects and Builders.The following bodies also use the R.I.B.A. building as their headquarters and meeting place: the Institute of Clerks of Works, the Provident Institution of Builders, Foremen and Clerks of Works, the District Surveyors Association and the Acoustics Group.

Some mention should also be made regarding relations with the Architectural Association. The A.A. is not technically an Allied Society. It is an independent body which is mainly concerned with the study and teaching of architecture in the widest sense and which has what may be termed 'Dominion status' so far as the R.I.B.A. is concerned. The great majority of its members are members of the R.I.B.A., its President (or other representative) is an ex-officio member of the R.I.B.A. Council and nine Presidents of the A.A. in its 100 years of life have become Presidents of the R.I.B.A.

The Architects' Benevolent Society is also an independent body. The President of the R.I.B.A. is, by tradition, President of the A.B.S.; the R.I.B.A. Council gives the Society an annual grant and office accommodation. The A.B.S. is a flourishing institution which finds its activities by no means superseded by state social services and which is always in need of money to meet the calls on its benevolence. Its grants are hedged round by few rules and are decided on the hardship of the individual case and, of course, it covers all architects and architects' assistants whether members of the R.I.B.A. or not. The necessary propaganda among architects for voluntary subscriptions suffers to some extent from the fact that details of its cases cannot be published, but during its 98 years of life it has relieved thousands of cases of hardship among architects and it continues to be very active today.

The Association of Building Technicians —once the Association of Architects' and Surveyors' Technical Assistants—is a registered trades union of men and women in salaried employment. The President or other representative of the Association is an ex-officio member of the R.I.B.A. Council.

Within the R.I.B.A. there exist various unofficial groups which meet to confer on matters of common interest. The Council allows these bodies to use the meeting rooms and committee rooms. They include the Modern Architectural Research Group, (MARS), the County Architects' Society, the City and Borough Architects' Society and the Library Group.

In its foreign relations, the Royal Institute has been invited to undertake responsibility for the British Section of the International Reunion of Architects which as a recent amalgamation of two pre-existing international bodies of architects held its first congress this year. It also fosters the Franco-British Union of Architects, a social body with an equal number of members from each country, which dates from the time of the entente-cordiale between France and Britain in the reign of King Edward VII.

THE R.I.B.A. STAFF ORGANIZATION

All matters concerning the appointment and remuneration of staff and of the care and upkeep of the premises at No. 66 Portland Place are in the hands of the Finance and House Committee. The Secretary R.I.B.A. is in charge of the staff and is responsible for the organization of all Institute business: the Assistant Secretary works under his direction. With the rapid growth in Institute business during recent years, the staff has tended to become more departmentalized than heretofore. There is a senior officer in charge of each department who is responsible to the Secretary R.I.B.A. and who attends to the business of those Committees which are concerned with the work of his department. The senior officers are the Secretary of the Board of Architectural Education, the Librarian, the Editor, the Public Relations Officer, the Negotiating Officer and the Chief Clerk. The Chief Clerk runs the general office and is responsible for all junior staff; he acts as a kind of 'adjutant' to the Secretary. Cleaning of the building, maintenance of furniture and equipment, etc., is in the charge of the Staff Engineer.

In the year 1900 the staff numbered 8; today it totals 80, including house staff, canteen staff and cleaners. These figures represent vividly the extraordinary extent of the growth of Institute affairs in the last half century or so as has been described in this article. They show how the Institute has grown from a comparatively small

metropolitan society into a world-wide organization. They also reflect the great change in status which the practice of architecture in this country has undergone in that time. This enormous growth occurred almost entirely during the time when Sir Ian MacAlister was Secretary. This was no mere coincidence; while it would be as untrue to say that he was wholly responsible for the growth in stature of the profession that occurred at this time as to say that it would have occurred in any case, there can be no doubt that his guiding influence and his far sighted and patient toiling towards objectives were extremely powerful factors in it.

The efficiency of a professional body depends to no small extent on the way in which its salaried staff is organized and, more particularly, on the way in which it treats its staff. That there is little to complain of in the latter respect is shown by the fact that, on the whole, most members of the staff remain in the employment of the R.I.B.A. for very long periods. Quite early in the history of 'social services' the Royal Institute established a staff pensions scheme and has recently started a canteen, primarily for the staff but open to members also. The staff runs its own Christmas party.

Although the Institute has 'office hours', actual working times often extend late into the evenings during the Session. The Library operates a special roster of staff attendances to cover the long hours that it is open, though every department has its times of special high pressure represented by such items as examinations, conferences, the preparation of exhibitions and the 'going to press' of the JOURNAL.

Some idea of the amount of business transacted is given by the fact that the total number of letters sent out is about 86,000 per annum and that the annual telephone bill is about £480.

THE R.I.B.A. BUILDING

No account of the work of the R.I.B.A. would be complete without some remarks —for the benefit of the more recent generation of members and students—about No. 66 Portland Place. In the early part of the inter-war period the old headquarters at No. 9 Conduit Street became extremely congested; the Library in particular had far outgrown its accommodation. Following its own advice to the Government of the day that times of trade depression could best be relieved by capital expenditure on building works (advice now generally realized to be eminently sound), the R.I.B.A. set out to build its new headquarters in the depths of the financial depression.

Again following its own advice, the R.I.B.A. held a competition, open to its members, which was won by Mr. G. Grey Wornum [*F*]. The building was completed in 1934 and opened by H.M. King George V, the Institute's Centenary being celebrated at the same time.

Although at the time when the building was planned, what was then thought to be sufficient allowance was made for expansion, the steady increase of Institute activities has once more brought about a shortage of office accommodation. Several rooms originally planned for storage purposes have had to be converted for use as offices, but the shortage is still acute.

The Royal Institute has gained greatly in prestige from its building. While architects, being strident individualists on matters of design, may and do differ about this or that architectural feature, there is no doubt that it is much admired by the general public; they like its dignity, its clean lightness and its skilful decorative employment of materials. Unsolicited praise of the building from lay visitors is a commonplace to members of the staff. The building has also had no small influence on both members and staff, the latter finding it an efficient and pleasant machine for working in, the former regarding it as something of a symbol of the dignity and contemporary outlook of their profession.

THE INDIVIDUAL MEMBER

This article has outlined the purposes, growth and present working of the R.I.B.A. as the central professional organization of architects in this country. It has shown that such a society must have the dual aim of upholding the highest ideals of the art of architecture and of seeking the well-being of its qualified practitioners. This dual aim is indivisible; high standards in architecture and a body of skilled and adequately remunerated architects are interdependent and must co-exist. This is fully realized by most architects and by those informed members of the general public who think about architecture.

As has been said before in this article, the practice of architecture is more and more assuming the characteristics of a national service. Whereas during the past century good architecture was provided by individual effort (of client and architect), against a background of unplanned meretricious building, today good architecture in properly planned surroundings is more and more being provided for the nation as a whole at the instigation of the government, by a combination of public authorities and private effort. It is into this new picture that the individual architect with his trained sense of design, his technical skill, his professional integrity and his wide approach to planning problems, has to fit himself.

The individual architect has his personal aims and problems. He believes primarily in architecture as a pursuit and as a mode of life for himself; only secondarily does he regard it as a means of livelihood, for it is obvious that there are far easier ways of merely making money. But he requires to be assured of opportunities to exercise his talents in creating architecture, of working conditions that place him above the hardship level, of security against exploitation and of the maintenance of his professional and technical integrity. Much of this objective can only be achieved by personal effort, by his rejecting complacency and seeking perpetually to make himself a better architect. The remainder can be achieved by co-operative effort with his fellow architects, both in the regional grouping of an Allied Society and in the national organization of the R.I.B.A. The personal effort and the co-operative effort must go together. Alone he is at the mercy of too many external forces, though it is true that a small minority of architects do succeed in remaining unattached by taking advantage of the facilities and safeguards which the majority has established by co-operative effort. Yet co-operative effort in the R.I.B.A. is no substitute for the personal skill and initiative of the individual; the R.I.B.A. cannot 'spoon-feed' him to personal success, though it can and does make his work easier, advance his status and protect him against exploitation. Yet in doing this the R.I.B.A. rests on the average of ability, technical skill, integrity and initiative of members as individuals. The higher the standards in these qualities the more it can achieve and the greater can become its power for good.

There is no doubt that the geographical location of the individual architect influences his opportunities both of advancing himself and of taking part in co-operative effort. The country member is apt to feel remote from the centre of things—even overlooked—to derive little benefit from his membership of the R.I.B.A. and to have little chance of making his contribution to the common good. One purpose of this article has been to show the country member that he is not overlooked and that the central organization has done and is doing much for him. But even if remotely placed, he can nevertheless do much to uphold the standards of architecture and of his profession and to advance a proper appreciation of architecture in the minds of the general public; he can do those things alone in his own area; he can do more by taking an active part in the affairs of his Allied Society and by a live interest in the work of the R.I.B.A.

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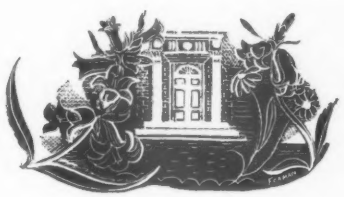
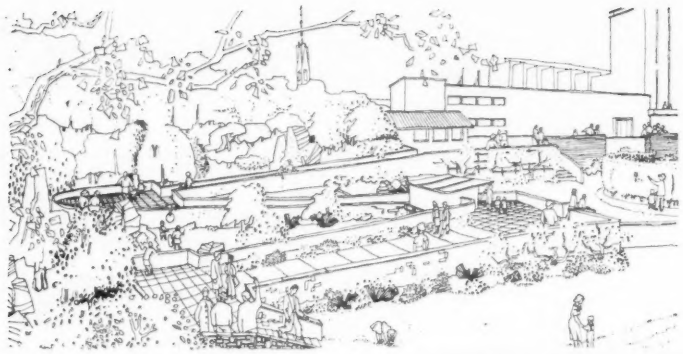




Sketch of the public gardens

Harlow New Town Exhibition

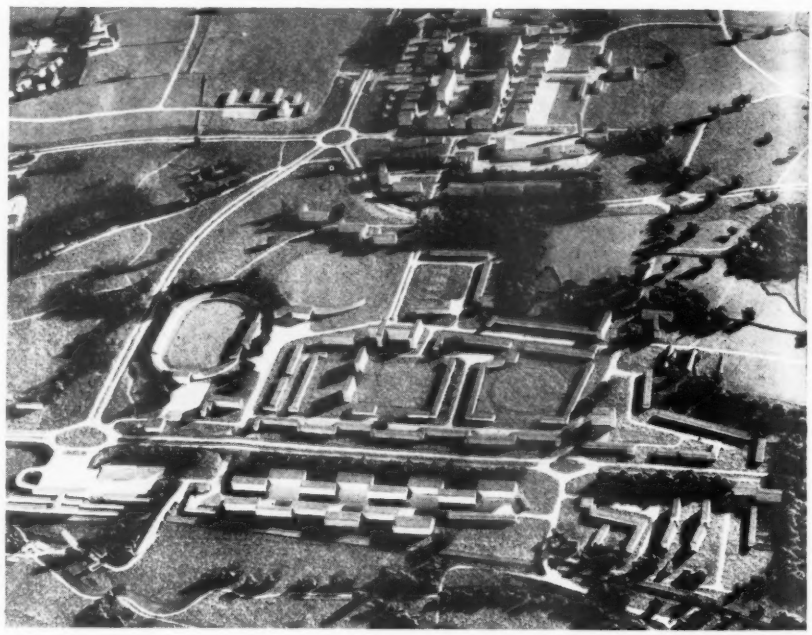
At the R.I.B.A. 23 to 30 October

The Minister of Town and Country Planning, the Right Hon. Lewis Silkin, M.P., is to open on 22 October at 3.30 p.m. an exhibition illustrating the master plan of Harlow New Town and the first development work now proceeding. The event will be unique in the annals of the Royal Institute by being the first occasion that an exhibition will be shown there which is entirely devoted to the planning and design of a new town sponsored by the Government. In this it marks an important point in the long struggle to achieve positive town planning, which the early planners like Geddes, Unwin and Howard foresaw and worked for untiringly.

The necklace of new towns now about to be placed round our ancient metropolis and the other new towns in the vicinity of the big industrial conurbations represent a project which has stirred the imaginations of planners all over the world; though the British public—and, indeed, British architects—have so far watched this epoch-making event with remarkable unconcern. In this country we have barely noticed the quite staggering revolution which has occurred, in that a British government—of all people—is undertaking a great work of imaginative construction and putting into it an energy and drive hitherto reserved for the emergency creation of armies and navies. The British people do not yet realize that these towns, planned with the fullest knowledge of past errors and demanding for their creation the best technical and artistic capacity of the nation, from soil-analysis to the highest flights of architectural design, are likely to be viewed historically as one of the greatest achievements of the late twentieth century.

The central feature of the exhibition is the Master Plan by Mr. Frederick Gibberd [*F*], A.M.T.P.I. The rest of the drawings, charts and models tell the story of how the plan is being worked out in detail from trial borings to the design of kitchens under the direction of the Chief Architect, Mr. Noel Tweddell [*A*] and the Chief Engineer, Mr. O. W. Gilmour.

Mr. Gibberd's plan was published a year ago, though this is the first time that its full range of drawings and models will be on public view in the West End of London. The town is planned for a balanced community of 60,000 inhabitants, and would have pleased Unwin because it is planned 'against a background of open space', to quote one of his tenets. Thus it is a series of groupings of built-up areas between stretches of green agricultural and park land, having thirteen residential areas in four major groups, a town centre and two industrial areas. We reproduce here a few typical illustrations of the scheme.

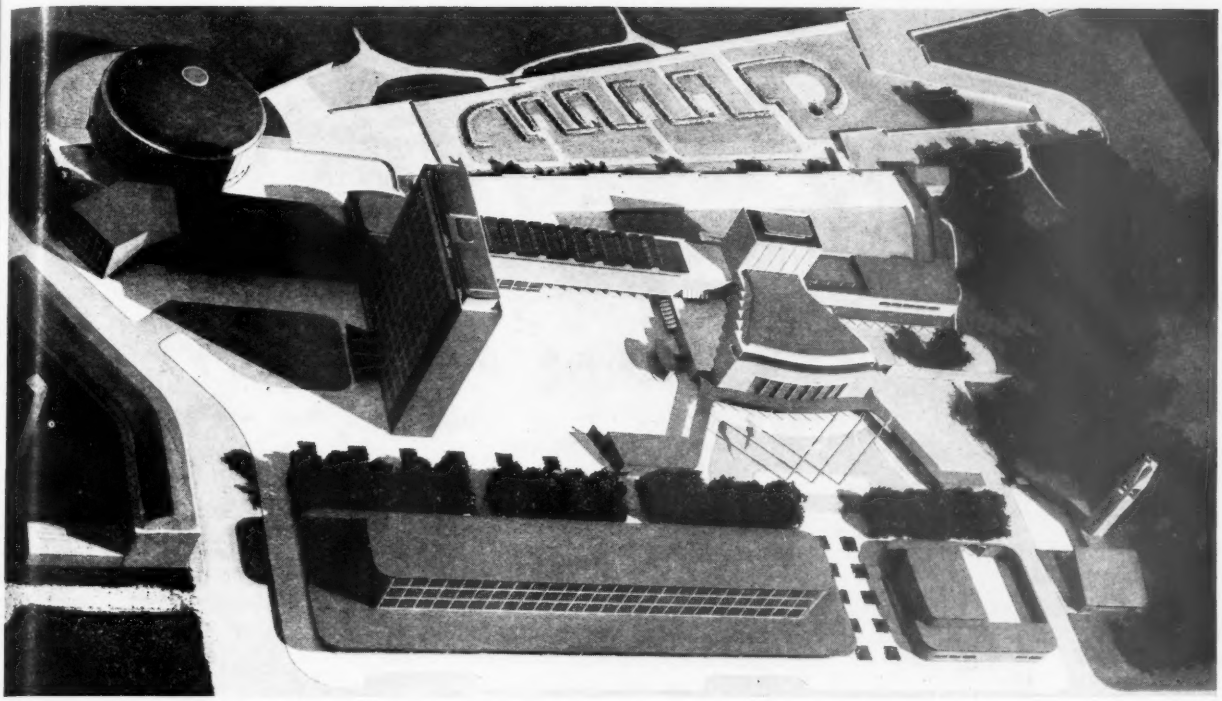


Part of the model of the town. In the foreground is the station and warehouse area, beyond it the sports area, and beyond again the shopping centre. The light patches are housing

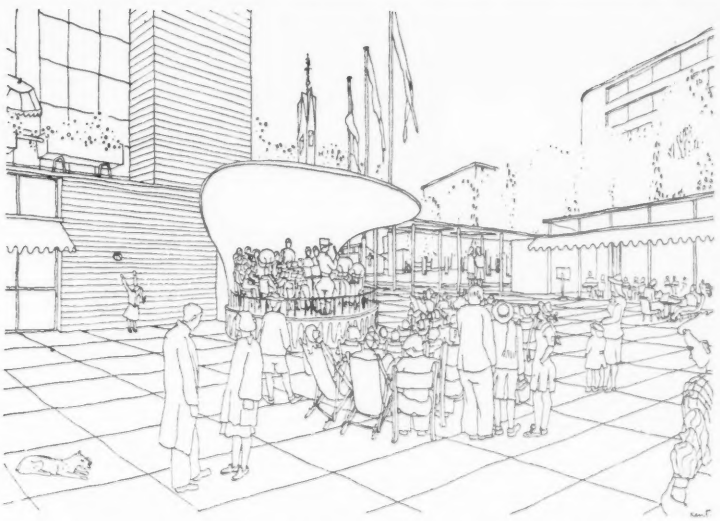
The first development work begins with a little group of 98 houses—the 'Post Office site'—partly to house corporation officials and construction workers, and partly to relieve existing overcrowding in Harlow. The first major project is the Mark Hall neighbourhood unit comprising two of the thirteen residential areas and for a population of 12,000, while preliminary work is proceeding on the eastern industrial area.

The engineering exhibits include information on soil testing and soil mechanics, a model of the geological system, sections and models of proposed roads and illustrations of how existing roads and new roads are to be tied together. One interesting feature of the engineering work has been the preparation of a grid survey of the town site, the Ordnance Survey not having one. The Ordnance Survey said they had a record of a trigonometrical point fixed 80 years ago in the middle of a field on the site; a 5 ft. wide hole was dug at the spot indicated and the mark was found 2 ft. below the grass!

Much of the work that has been done in the past year is of a nature that cannot be illustrated. Preliminary surveys, negotiations and discussions with government departments, the county council and adjacent local authorities, with power and water authorities may be, and indeed have been, prolonged and elaborate; they may take months and yet result in a little more than a few marks on a map at this stage of the development. Impatient onlookers may think that 'nothing is being done' because they cannot see bulldozers and bricklayers



Part of the model of the civic centre. Right: sketch of the civic square



at work on the site; but this is the critical time when mistakes once made are made for ever, so that time spent on discussion in getting things right to start with is well spent. But Committee discussion is poor exhibition material.

While architects have no small interest in how preliminary negotiations are conducted and in the engineering substructure of a new town, their minds are apt to leap forward to visualize the architectural environment that will eventually come to birth. In this Mr. Gibberd's suggestive drawings and models are sufficiently stimulating. They show creative imagination of a high order and a comprehension of urban space which are very very far removed from the façade-making which was popular not so very long ago. In the introduction to the descriptive part of his planning scheme he stated the creed—he merely called it 'procedure'—that he had followed in making his design. Below we quote a few sentences from that creed.

'It is the urban quality which one senses in such towns as Edinburgh, Bath, Oxford and Florence, which must be captured in the new town of Harlow; for unless it is captured then it can not be called a town in the essential meaning of the word.'

'How is the urban quality to be captured? Certainly not by regarding town planning as the preparation of a map showing different coloured areas for different purposes and for different circulations. In the first place, given a satisfactory functioning of the parts, the quality of urbanity arises from the nature of the buildings—Architecture, and the relationship of the buildings to each other—Civic Design.'

'A Master Plan must make possible fine architecture. It must not only make possible fine Civic Design, but show how it can be attained. Civic Design is the art of arranging buildings, or groups of buildings, in relation to each other and to the landscape. In Architecture we are primarily concerned with the spaces occupied by buildings—the rooms—in Civic Design the spaces between buildings.'

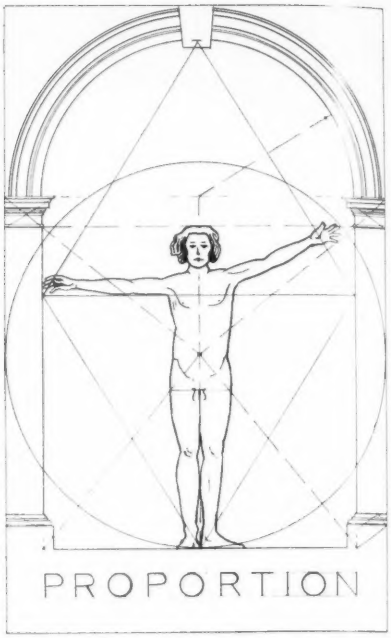
'As buildings have height we have to think of the spaces between them as volumes. The average housing estate is dull and lacks qualities of urbanity, because buildings of similar size are equally spaced along roads of similar width. There is no sense of space enclosure at all, only two broken street frontages divided by a street.'

'But if treated as a problem of Civic Design the buildings would be arranged in groups, with all their elevations of equal significance, to form open spaces or volumes. There would be continuity between the buildings themselves and the spaces they enclose. Works of art require variety as well as unity; therefore different spaces formed by building groups will vary in shape and size by their plan form and by changing height and size of the buildings themselves.'

The Golden Section or Golden Cut

The Mystery of Proportion in Design

By Manning Robertson [*F*], M.R.I.A.I., M.T.P.I.



This thesis by the late Manning Robertson was found among his papers after his death in 1945. *It deals with a little understood subject that was the special province of the late Harry W. Roberts, and one to which he devoted a lifetime of study, and from which he developed what he called* '*R*'s *method*'. *Manning Robertson was one of those who studied under Roberts. Mr. A. Leonard Roberts* [*F*] *is at present editing his father's papers for publication in collaboration with Mr. Mark Hartland Thomas, M.A.* [*F*]. *To clear up some slight ambiguities in the thesis we asked Mr. Leonard Roberts to revise it. This he has done, making a few minor amendments, redrafting one paragraph, and adding some footnotes.*—Editor.

INTRODUCTION

The key to Man's proportion seems to be the strange ratio which we call 'The Golden Section' or 'Golden Cut'—1 : 1.618—and which is obtained from segments of a line divided into extreme and mean ratio. The purpose of this article is to show that this ratio also largely dominates proportion in building as well as design in pictures. It offers no definite solution as to why this should be so, but leaves the reader to arrive at his own conclusions when he has been given certain facts.

I was first introduced to the golden cut by the late Harry W. Roberts, who devoted much of his life to investigating the strange behaviour of set squares and the mysteries of proportion. For example, the reader can observe, as Mr. Roberts pointed out, that his arm (upper arm, forearm, and hand) is divided in the ratio $\sqrt{3}$, $\sqrt{2}$, $\sqrt{1}$. If he gets his wife to measure him up he will be astonished at the accuracy of Mr. Roberts's observation.

Mr. Roberts published a book* dealing with the ordinary 45 degrees and 60 degrees set squares, but so far little has been published on the still more remarkable series of set squares based on other angles which, many years ago, he expounded to some of us architects. The conversations I had with him were on general lines, but the means of building up the golden section, as well as the examples illustrated are the result of experiments of my own.

The work initiated by Harry Roberts has not received the attention that it merits, and this thesis is intended to show, so far as I am permitted, some of the possibilities opened up by this new departure in human knowledge—or is it perhaps a rediscovery of ancient secrets whose loss was deplored by Albrecht Dürer?

Everyone enjoys a good mystery story, and I hope that this excursion into the obscure may interest the layman no less than the professional architect and artist. In pursuing the intricacies of a good detective story we are sustained by the knowledge that in the last chapter a kindly Holmes, Thorndyke or Poirot will clear up our doubts and difficulties. In our quest the reader will be left to draw his own conclusions, after having been put in possession of certain facts. This is not due to love of mystery-making on my part, but because we are to chase a peculiarly elusive will-o'-the-wisp—one that has been regarded as rigid, magical, secret, and (during the past century) non-existent.

A fair definition of the present-day attitude is still that given by James Fergusson, in his monumental six-volume *History of Architecture* (John Murray, 1893), 'as proportion to be good, must be modified by every varying exigence of design, it is of course impossible to lay down any general rules.' The Ancients were not of this opinion. Let us examine, with complete impartiality, whether Fergusson is right to the exclusion of ancient ideas; whether the Ancients are right to the exclusion of Fergusson; or whether both may not co-exist without conflict.

We select our target ourselves; its appearance is known to us, and in tracking down its significance there is no need to enter into tedious technicalities, nor to linger in the obscurities of history. We turn to Euclid, Book VI. Proposition 17. This states that when straight lines are proportional (i.e. when A : B : : B : C) then the rectangle AC will be equal to B^2, and this brings us into touch with extreme and mean ratio, to which various names have been given.

We have to turn to a former proposition —Book II. Prop. 11—to see how Euclid establishes extreme and mean proportion in a straight line. Fig. 1 is a development of Euclid's figure in connection with the earlier proposition. It shows not only the construction necessary to obtain extreme and mean ratio in the division of the line AB but also how the golden rectangle CDEF and its golden diagonal DF arise from it. A half-way division gives R's golden related slope—which is inset in his golden set square. Armed with this set square, the four slopes of which can be used either way up, and which are of equal significance, we can not only set out new designs but also examine other designs to see if they comply with it.

HISTORICAL REFERENCES

The Ancients. Having arrived at what geometry would lead us to believe is ideal proportion, we now approach the subject from the other end and find out what Vitruvius has to say about proportion in buildings. Vitruvius was a Roman, writing during the reign of Augustus in the first century B.C., and his treatise on ancient architecture is the only written Roman record we have on the subject.

In dealing with proportion he tells us that the measurements are derived from members of the human body.* In his words: 'If Nature, therefore, has made the human body so that the different members of it are measures of the whole, so the ancients have determined that in all perfect works of art, each part should be of some aliquot part' (i.e. a number contained an exact number of times in another) 'of the whole. . . .

* *R's Method of Using Ordinary Set Squares*, by Harry W. Roberts. The Architectural Press. London. 1927. Mr. Roberts attributed the name 'Golden Cut' to A. Junge.

* *Vitruvius' Architecture*, Joseph Gwilt's translation.

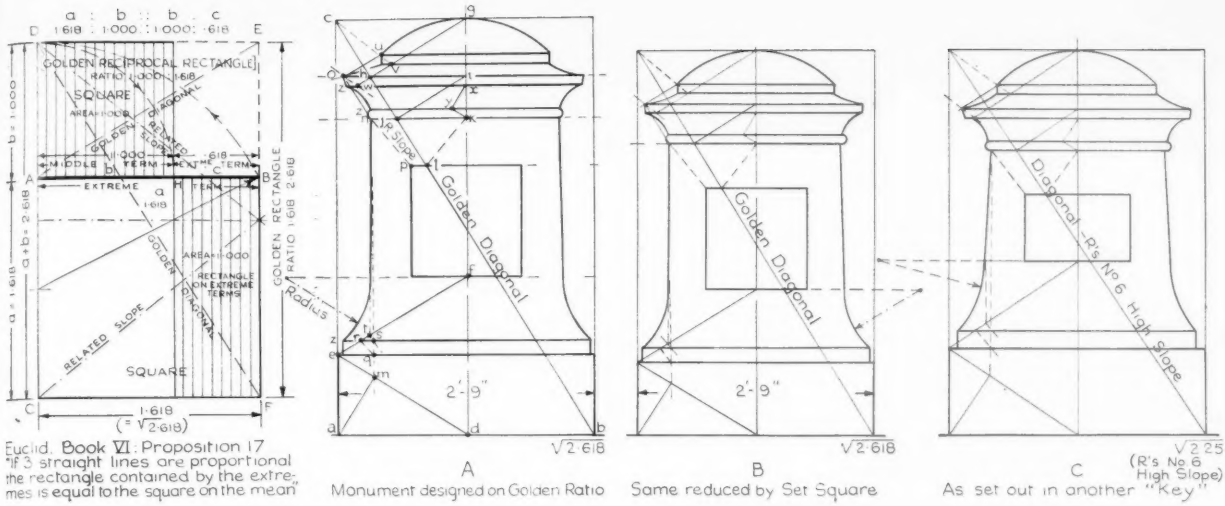


Fig. 1

The measures necessarily used in all buildings and other works are derived from the members of the human body, as the digit, the palm, the foot, the cubit, and that these form a perfect number . . . the ancients considered ten a perfect number, because the fingers are ten in number . . . as the foot is the sixth part of a man's height, they contend that this number is perfect; the cubit, also, being six palms, consequently consists of twenty-four digits.' Again: 'If it therefore appear that numbers had their origin from the human body, and proportion is the result of a due adjustment of the different parts to each other, and to the whole, they are especially to be commended who so arrange the parts that the whole may harmonize in their proportions and symmetry.'

To obtain measurements of the human body, Vitruvius says that if a man lies face upwards, with hands and feet extended, the navel will be found to be the centre from which a circle can be described that will touch fingers and toes. The body can further be placed inside a square. He then gives a detailed analysis of the ratio of parts, the head being (he asserts) one-eighth of the whole.

Leonardo da Vinci. Leonardo's famous diagram, shown in Fig. 2, has come in for criticism on the ground that the head should be about 1/7.6 rather than one-eighth of the total height, but the human figure is to Vitruvius's specification, and we shall be examining this discrepancy later.

We are now faced with two apparently unrelated facts: (1) the geometrically perfect form from Euclid's proposition; (2) that design should be based on the proportions of the human body. Let us see whether these two facts are connected. Fig. 2 illustrates how our set square slope lines, as illustrated in Fig. 1, do in fact give us, not only the connecting link between the circle and the square, but also the main lines upon which Leonardo has based his figure. *The golden slope or diagonal is shown in plain lines in all our diagrams, while the Related Slope is in broken lines.*

Although Leonardo's figure implies the golden related high slope, it does not actually show it, so let us turn to Leonardo's great contemporary, Albrecht Dürer. In his view* 'the Creator fashioned men as they *must* be, and I hold that the perfection of form and beauty is contained in the sum of all men . . . without proportion no figure can ever be perfect, even though it be made with all diligence.'

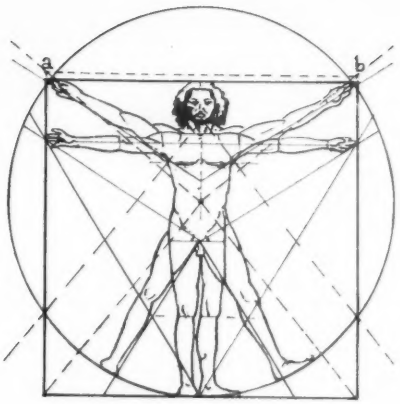
Dürer. In the 'Opera Alberti Dureri' (Arnham Janssen, 1604) we find a vast array of diagrams, mostly built up through elaborate calculation. *One geometrical slope alone* is given as dominating the proportion of the male body. It is our low related golden slope, running from the navel to the point we have marked 'a' on Fig. 2. Fig. 19 shows this slope marked (*d*), and the inset hand reproduces a portion of Dürer's diagram. Dürer inserts the golden diagonal, and also gets the head right. Bewailing that the ancient secrets had been lost, Dürer, who was not an architect, wrote a treatise on proportion in design, but since he was chiefly concerned with pictorial art we can expect no direct help from him in our search for proportion in building. Since, however, he shows the golden related slope in his diagram of a man, and considers man's form to represent perfection, we may reasonably hope to find the golden diagonal taking its place in his engravings. Later, when we examine some of them we shall not be disappointed.

In dealing with the Ancients and with Leonardo and Dürer we see that the golden ratio and the human form are associated, although the link between them has been elusive and tantalizing to discover. It is as though something were at the back of their minds that they never mentioned outright. The query is to come later when we examine as to whether their designs actually do comply with the golden ratio.

Wren. With the revival of the classical approach in the 17th century the insistence on the human form vanishes. Christopher Wren traced the conception of beauty to two sources, the Natural and the Customary. The Natural he defined as 'the beauty of Uniformity and Proportion, based on Geometry . . . the square and the circle are the most beautiful'. The only reference I can find to the human form is where Wren describes the probable origin of Doric columns—'a Walk of Trees is more beautiful than the most artificial portico; . . . in which we see that they (the Doric architects) imitated Nature. Most trees in their prime, that are not saplings, or dotards, observe near the proportion of Doric pillars in the length of their bole, before they part into branches. This I think the more natural comparison, than that to the body of a man, in which there is little resemblance of a cylindrical body.'

Wren's advice is always straightforward and practical—sometimes strangely so, as when he says: 'Strait lines are more beautiful than curve (sic). . . . There are only two beautiful positions of strait lines, perpendicular and horizontal. . . .' If therefore we try out the golden set square and its related slopes on Wren's designs we have no warrant from him for doing so, and if we find that they comply with this particular proportion we must assume, either that he designed to it and deliberately kept it secret, or—far more probable—that they comply with the golden slopes because they give a particularly happy result. It will at least be interesting to examine some of his designs and see whether the golden set square can give their main proportions.

* *Albert Dürer*, by W. M. Conway. Cambridge University Press. 1889.



Leonardo's Diagram, with Golden Related Slope Lines superimposed.

Fig. 2

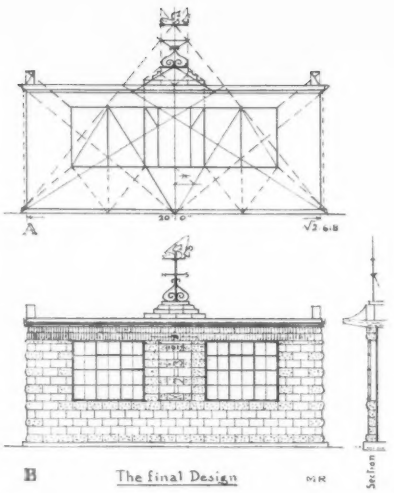
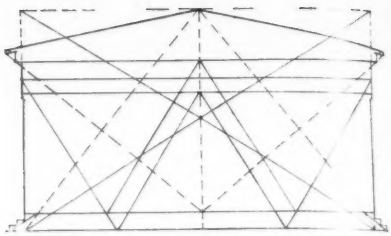


Fig. 3



The Parthenon

Fig. 4

Chambers. The next great architect in succession to Wren was Sir William Chambers, designer of part of Somerset House. He tells us everything he can think of about proportion in buildings. The only reference I can trace to the human form is when he says that in certain cases small columns may be spaced further apart than is customary in order to give room for a fat man to get between them.

Chambers based his proportions on the width of the column at its base and, on this, the proportion of every other part of the structure depends. The unit of measurement is the 'module', which is the radius of the column at its base, and this is divided into 30 minutes. Chambers held that 'Nature is the supreme and true model of the imitative arts; and the antique is to the architect what nature is to the painter or sculptor'.

The proportions adopted by Chambers in terms of modules were not fixed; thus he says: 'I have made the height of the Doric columns 16 modules, which, in buildings where majesty or grandeur are required, is a proper proportion; but, in others, it may be somewhat more slender.' There is nothing rigid about this kind of advice, and our golden set square, with its fixed ratio 1.618 to 1.0 can have no connection with the advice given by Chambers, of which the following is typical: 'The composite entablature may be reduced to two-ninths of the column . . . by making the module only nine-tenths of the semi-diameter.' Chambers based all his calculations upon what *looked* well, and was reasonably in accordance with classical and Renaissance precedent.

Let us anticipate Fig. 1A. How should we design this monument with our set squares? We would make it 1 unit wide and 1.618 units high, to comply with human proportions; also, the ratio of half the width to the height of the base would be as 1.618 is to 1; and so we would continue until we had fixed the smallest detail.

Chambers would have done exactly the opposite. He would have said something like this, 'if the base be 1 unit high, then in order to look well, the height should be $5\frac{3}{8}$ units and the width $3\frac{3}{4}$ units,' and so on.

The two methods have nothing in common, since ours is to enclose the whole design within a golden rectangle framework and so continue down to the detail. Chambers builds up *by measurement* from a very small part and by multiplication arrives at the whole. His fractions are all $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and so on, and in no case is there any reference to such an extraordinary fraction as our .618. How shall we explain it if we find that Chambers' conceptions arrive at the 1.618 to 1.0 ratio after all?

We can be absolutely certain that Chambers did *not* consciously design to the golden ratios.

Mystics. So far we have examined only what authorities have *said* about design. References to the human form, always hazy, had vanished by the time of Chambers. We do, however, find this human proportion cropping up insistently from another quarter. Mystics, notably Blake, and Swedenburg, have always laid stress on the human form, hence suggesting a special and deeply rooted application of golden ratio to design generally. Such terms as 'Magic Section', 'Divine Proportion', and esoteric references, mixed up with a good deal of secrecy, increase our bewilderment, and decide us to get back to something tangible, and so we pick up our golden set square.

PROPORTION IN ARCHITECTURE AND PAINTING

We now know how to get our angles both for the golden set square and its related slope. We can make our slopes carefully of thick cellophane or, better still buy R's Related Set of Set Squares, which contains the golden set square and its related slopes all accurately manufactured. Before we start with our set squares we must be quite clear as to their purpose. If we cut a square out of a piece of cardboard and then draw a diagonal and cut along that line we have a set square of 45 degrees. If we now draw two lines at right angles to each other, one of which is a horizontal base line, and if these lines meet at a point (*a*) then our set square laid along the base line from (*a*) to a point (*b*) 5 in. from (*a*) will give a 45 degrees slope that will meet the vertical at (*c*) 5 in. up. It is not the slope itself which is of interest but the tangent which the slope controls and its ratio to the base of the particular set square used. The high slopes given by our golden set square and its related slope can be set up to $58\frac{1}{3}$ degrees and 51 degrees respectively. In our golden set square, if our base is 10 in. long our vertical will be 16.18 in. high. If we lay the square the other way up and the base is 10 in., the vertical will be 6.18 in. long. The related slopes give the heights respectively as 12.36 in. and 8.09 in.

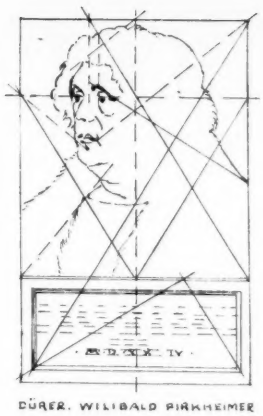
Let us now see how we use these slopes to keep a constant ratio in a design. In the small monument (Fig. 1A) we start with a base line (*a-b*) of any required length, say, 2 ft. 9 in., to the scale of a quarter full size. Draw a vertical from (*a*). The golden set square then gives us a slope from (*b*) cutting the vertical at (*c*), giving us the total height of the monument.

From (*d*) on the centre line the set square laid lengthways gives us (*e*), whence we obtain (*f*); (*g*) slopes to cut (*b-c*) at (*h*). Rule a horizontal through (*h*). From (*i*) we get (*j*); from (*j*) we can get (*k*), and from (*k*) the related slope gives (*l*). We now have the principal horizontal framework for our design.

To obtain widths we start from (*m*); (*n*) leads to (*o*) and to (*p*). From (*q*) we obtain (*r*), and this gives us (*s*), and so to (*t*); (*u*) is derived from (*c*) and (*g*). (*g-h*) produced gives (*w*). (*x* and *k*) give (*y*). Points marked (*z*) would be found on a full size drawing by further sub-division.

This monument was designed and erected by me before I had heard of the golden set square and its ratio. It is perhaps no more astonishing that it should fit than it would be if a composer were to write a few bars of harmonious music, although he had never heard of a musical key and were subsequently to discover that he had used some particular key. He could hardly have done anything else!

Fig. 1B shows the same monument set out on an arbitrarily smaller base with the aid of the set squares, without any measurements being taken. Geometrical design of



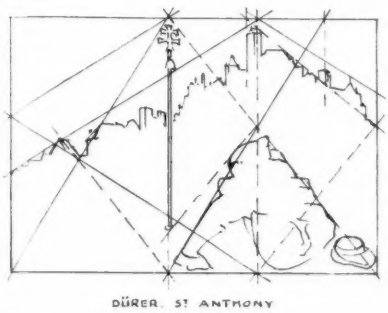


Fig. 5

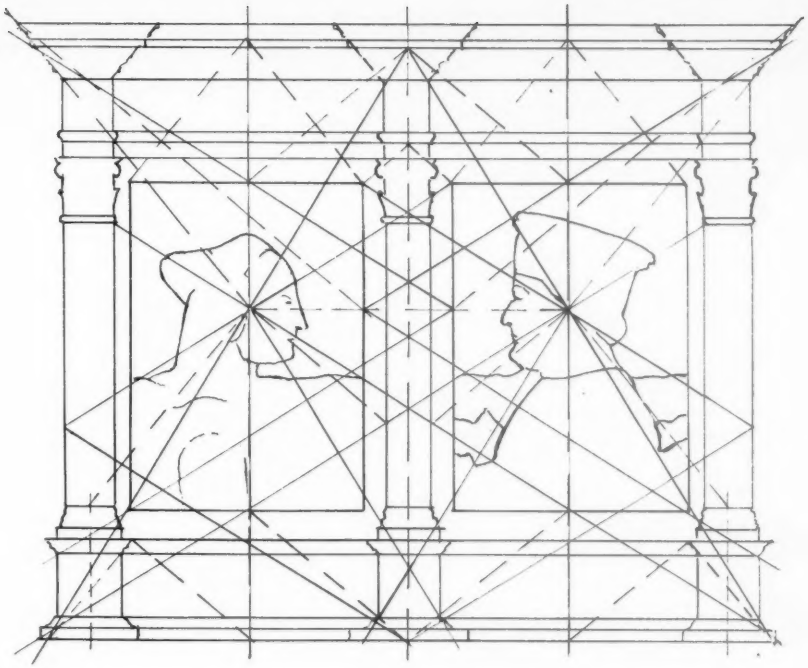


Fig. 6

this kind, as Harry Roberts pointed out, enables any design to be reproduced to any required size with no more trouble than the correct application of the set squares.

Fig. 1C shows the same monument set up in the same way, but in another 'key', as it were. Here I have used a set square giving the ratio 1; $\sqrt{2.25}$, and the proportions of the monument have suffered. The analogy with a musical key holds useful implications. For example, the use of the golden set square, or any other set square, can no more make a bad designer into a good one than can a knowledge of musical keys make a poor composer competent. The reader is at liberty to dislike the design of my monument; but this only means that he disapproves of the particular way I have used the set squares. If he wants a monument of that kind, of about those proportions, he can set it up in this way, or decide on his own method of set square triangulation to meet his own ideas about the design.

Fig. 3 shows a fishing cabin that I built for myself in 1927, also before I had heard of the golden ratio, and yet it fits as well as did the monument. This is made possible by the fact that the standard steel casement complies with the golden ratio, but whether the makers did so consciously I do not know—probably not. Again it will be observed that the cabin can be drawn on a base of any length solely by using our set squares.

So far we have discussed only general principles, with a couple of small home-made illustrations. Let us now turn to great works and carry out some experiments. Before doing so we must take warning that only large coincidences on a small scale drawing are of any value. Also we must be sure that we only concern ourselves with points or lines of real significance in the design. R's golden set square presents us with four slopes, since each slope can be used either way up; one of these slopes applied at a focal point will almost certainly hit *some* other point of interest. Our best course is to take a skeleton elevation containing only the main proportions, and then see whether the slopes at our disposal will enable us to set this up.

At the very outset we have to face a crucial test, because if we are right in thinking that the golden ratio gives the most perfect proportion, and the Parthenon was by common consent the most perfectly proportioned classical building, then the Parthenon must obviously comply with the golden ratio. With misgivings we accept the challenge, and Fig. 4 shows the result. The Parthenon is the only building I have examined whose ratio of length to height is that given by a single application of the golden ratio.

We now skip the centuries and turn to Dürer, who first delineated the golden ratio as the key to human proportions. Amongst his easily accessible drawings and engravings, where these are framed in, his preference for direct golden proportions is seen in 'The Witch,' 'Virgin and Child' (1503), 'Me-ento Miei,' 'St. Thomas,' 'St. Bartholomew,' and in many others. The 'St. Anthony,' which is illustrated on Fig. 5, is peculiarly convincing, because it is not obviously amenable to the golden ratio at all, but on examination it turns out that the whole design is built up to this ratio. We also choose the Pirkheimer portrait, as having a well-marked base and a clearly defined structure.

The difficulty facing the layman when he comes to analyse pictures is that few show distinct points suitable for exact measurement. Amongst the exceptions we select the double portrait of Federigo da Montepeltro, Duke of Urbino, and his wife by Piero della Francesca. Can we set this up? We discover that the whole design complies with our golden ratio related slope, so this must be the 'key' of the picture. We do not show this line on our drawing because we want to ask our squares to do something special. We ask them on Fig. 6 to show what is the geometrical focus of the work, how the two heads react to one another, and how they dominate the geometry of the whole design.

The squares have no hesitation in telling us that the focus is the axial line joining in the centre of gravity of the two heads. The linking up of the heads is clearly shown, and from the twin foci our slopes radiate to every point of importance in the composition.

One would value the opinion of the art world and enquire whether it is not possible that understanding of pictures could not be increased if their geometrical set-up were more widely analysed and studied?

Before we leave pictures there is one great work that we ought not to ignore—

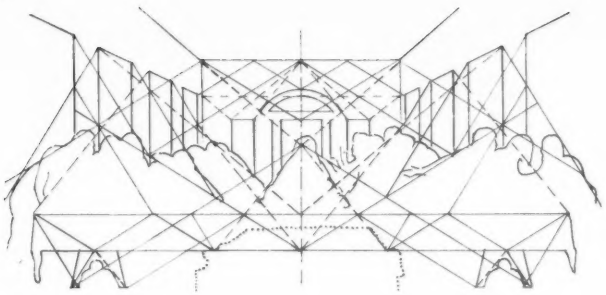


Fig. 7

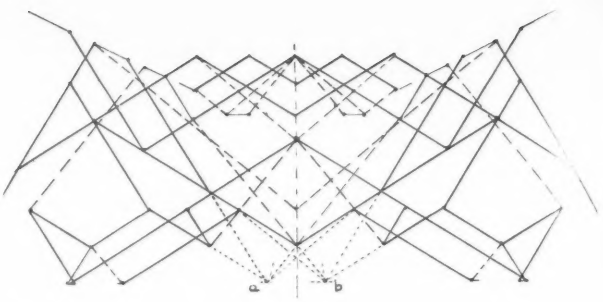


Fig. 8

the more so since its geometrical layout appears to have constituted a puzzle to which no solution has so far been found. Leonardo's 'Last Supper' might be expected to be amenable to our golden ratio, because he skirted very close to it in his illustration of the head in profile drawn for Pacioli's 'Divina Proportione'.

Fig. 7 illustrates the fresco in outline and includes only the salient points. A door has been cut through the bottom at the centre, hence the piece bounded by the dotted line is missing. The perspective lines converge on the head of Christ, and this is the focus of the composition. The radiant and other guiding lines, as revealed by the golden set square are sufficiently interesting to demand a drawing to themselves, and this is provided in Fig. 8. We note how insistently our lines demand two points of interest at (*a*) and (*b*) in the missing part of the picture. Since these points are the same distance apart as the trestle legs at each end, and if our setting up is on the right lines there is no doubt that there was originally a trestle in the centre. There must have been a support of some kind—presumably one trestle, or else two. Our set squares assure us that there was only one, and it would be interesting to know whether any record remains to verify or contradict what our set squares tell us.

Leaving this glimpse of pictorial art, we turn back to architecture and the Middle Ages and examine a suitable example. The Norman entrance shown in Fig. 9 complies perfectly, dramatically so in the slope of the gable.

The Gothic example (Fig. 10) I did not choose. It was the first façade of this period given to me to analyse and was selected haphazard by a friend. It follows the golden ratio from pinnacle to weathervane. The guiding lines emphasize the focal points with a nicety that adds to one's appreciation of the vigorous conception.

In the Byzantine tradition, so I understand, this same visual 'key' may also be traced in the design of the ground plan but, as I have not as yet worked out this trail myself, I can only allude to the observations of others, and am unable to submit an illustration.

In making these selections it has been necessary to choose examples with clearly defined focal points or lines, and in Renaissance work these are so definite that we need hardly select at all, but take the first that we come across. This is part of our plan to keep us impartial and unprejudiced.

We now come to our experiments with Sir Christopher Wren. His numerous pencil drawings, sometimes with settings out in circles or squares, might be expected to show settings-up to the golden ratio, if ever he had this proportion in mind. No trace is to be found.

Fig. 12 illustrates two of Wren's spires. They were the first two that caught my eye, and again there was no question of picking out something that looks 'in key'. The reader will note the correspondences between Wren's design and our golden 'skeleton' framework. It may be suggested that the west front of St. Paul's should be a good subject, but the details and the planes are so complex that it is virtually impossible to decide from an elevation which are the dominating lines. A more promising opening is presented in work where Wren, in preliminary pencil sketches, has shown only a few lines intended as the framework for the subsequent detailed design. Fig. 13 reveals that the garden front of Hampton Court Palace is astonishingly amenable. St. Nicholas, Cole Abbey, and a doorway are shown on the same diagram.

Even if Wren may conceivably have had some 'secret formula', we know that Chambers had none, we therefore approach his designs with exceptional interest. Deciding to institute a comparison between his designs and those of Wren, we make sure of complete impartiality by observing rigid rules. We select window designs by each man subject to the following conditions:

1. We bind ourselves to analyse the *first* designs of a suitable size that come to hand.
2. We draw what we consider the principal points and lines of interest, and do not add to these afterwards. We do this before we touch our set squares or have any idea what we shall find.

Fig. 14, A, B and D, show those we have hit upon to Wren's design. A is the exterior of Christ's Hospital. Our golden set square builds up its main lines without difficulty, but something has gone wrong with the window! Our set squares tell us that the bottom of the window should be lowered to the line (*a-b*), the top remaining where it is. The only thing about Wren's proportions that is known to every architectural student is that his window panes were based on $\sqrt{2}$, and so they are in this instance. Had the window finished on the line (*a-b*) then it would have satisfied our set squares as being in proportion with the rest of the design. Why did Wren place $\sqrt{2}$ windows in a $\sqrt{2.618}$ design? If asked, would he have said that it appeared all right, or would he have said, 'that is the worst of these pre-fabricated windows'? Have we improved the composition by showing the window as on C in the drawing? B and D (St. Lawrence Jewry) comply at once with our golden slopes.

It is now Chambers' turn, and we hit on the four window designs shown in Fig. 15. These are shown on Plate 25 of Chambers' *Civil Architecture*, by J. B. Papworth, 1826. This test is the most severe that we can devise, because the windows are drawn to a large scale, and the smallest error in our slopes will at once reveal itself. The drawings show these four windows and how easily we can set them up with R's No. 8 set square (60 degrees to 30 degrees) with its inset related slopes. Having no preconceived ideas or theories, we are interested, but not concerned, at the discovery that the slopes we have had to use are not those of our golden set square, but those based on $\sqrt{3}$ (ratio 1 : 1.732). This queer ratio is as remote from the building-up adopted by Chambers as is $\sqrt{2.618}$. $\sqrt{3}$ can easily be arrived at by drawing a square; swinging the diagonal upright gives $\sqrt{2}$; then, still on the same base, we swing up the diagonal of the $\sqrt{2}$ rectangle, and this gives $\sqrt{3}$ (see Fig. 21). It gives an angle of 60 degrees, like our ordinary 60 degrees to 30 degrees set square.

Let us take another random example from Chambers, and draw the two gate piers shown on Fig. 16. Setting these up we find ourselves back on the golden ratio. Chambers appears to conform with this proportion as well as with $\sqrt{3}$; but we should observe that all the four windows on the plate are $\sqrt{3}$; while the piers, which were designed as alternatives to a central feature, are both to the golden ratio.

Chambers has already knocked out of our heads any idea that *all* good designs must comply with the golden ratio. This

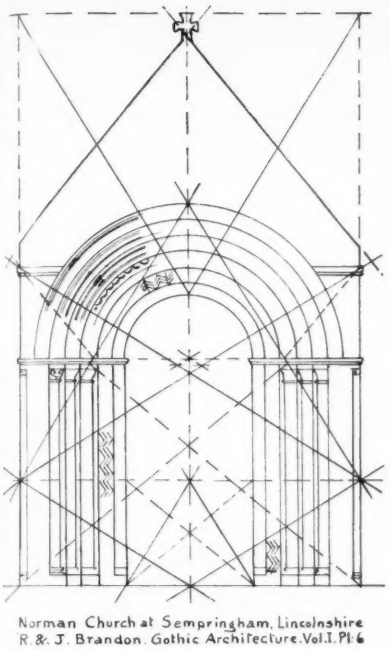


Fig. 9

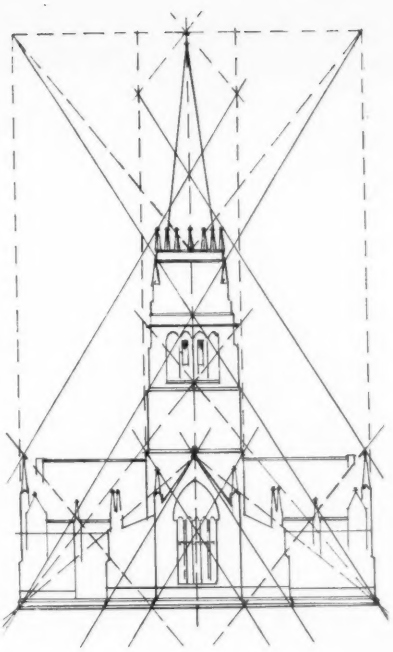


Fig. 10

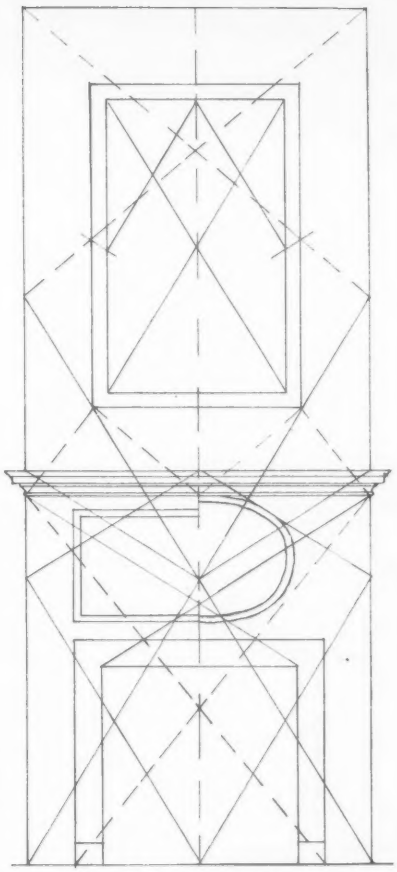


Fig. 11

would be repugnant because it would circumscribe the range of design. We undertake a further experiment and, without knowing who was responsible for the design, we choose the well-proportioned gate piers to the Botanical Gardens at Oxford, Fig. 16 C. We select these because the golden ratio refuses to give us the height of the base, and is therefore out of court. The first thing to do is to find what pair of slopes *will* give us the height of the base, then, if we are right in supposing that good proportion keeps to a constant ratio, we ought to be able to set up the whole pier with those squares. We find what we want almost immediately—in the form of $\sqrt{2.25}$ (R's No. 6). We next want to know whether this ratio 1 : 1.5 has any special geometrical distinction, and we discover that its related slope—ratio 1 : 1.333—is a much older friend than the golden slope; it is the Pythagorean triangle whose sides bear the values 3.4.5 by which (with the aid of Euclid 1.47) we make the right angles on our tennis courts. Thus we escape from the grip of two significant geometrical forms, to meet with a third.

A searching test arose when a friend with whom I had been discussing this topic said he would particularly like to know whether the 'Casino' at Marino, near Dublin, complied with the golden ratio. The Casino still exists as a gem of architecture, designed by Chambers for Lord Charlemont as a garden pavilion. Chambers never went to Ireland, but sent the design over. We have the drawing of this building and we set up its façade in Fig. 17, showing the main lines of our scaffolding in the left half and more detailed lines on the right. The numbers are put on to show how each line follows from what we have set up before. In this way we can draw the complete structure, and our tool is once again the golden set square. This being our principal drawing we spend a little time on it and show in the details on the left-hand half. It is beyond belief that the correspondence between the scaffold and the design can be due to chance.

We have now traced our golden ratio from the Parthenon to Chambers, and have even found it in humble little present-day designs of my own. It would astonish me to learn that the Cenotaph of Lutyens is not in the same tradition, but I have not analysed any modern buildings of consequence.* In our search we have not had to pick and choose, but have taken any design to hand that appeared promising. The vast majority that we have examined have responded at once to our application of the golden set squares, and the reader may wonder whether *all* designs are perhaps equally obliging in conforming to a fixed ratio. We have, however, selected our examples because we considered them well proportioned. Let us now analyse a building where this does not necessarily hold, and where the architect was unable to pay any attention to proportion as such. We select a Government Type plan pair of working-class houses. I choose the first that comes into my head (No. 200, Ministry of Health Journal, HOUSING, dated 20 Dec. 1920). That the architect paid no attention to proportion I know, because I designed it myself. Economy and rigid minimum areas and heights in such work restrict the designer so much that he can only concentrate on window grouping and the like, leaving the mass proportion to shift for itself. The design we are about to examine is shown at the top in Fig. 18. We have already noted that standard steel casements are in golden ratio proportions, so the rest of the building should conform with this 'key'. We apply our set squares and find that the block is 2 ft. 6 in. too short. Our set squares insist that the design should have been to the amended proportion shown in the lower half of the figure. Not only is the lower design obviously far happier, but the grouping of the four central windows more closely together overcomes the sense of duality that spoils the top design. The windows were unhappily spaced in the original pair, because they were placed centrally in the rooms. This suggests that perhaps we would do better to consider the outside rather more than we do and not mind so much about exact internal symmetry.

* My father reproduced the Cenotaph of Lutyens with his set squares in a very few minutes. I have his drawings of it. A. Leonard Roberts.

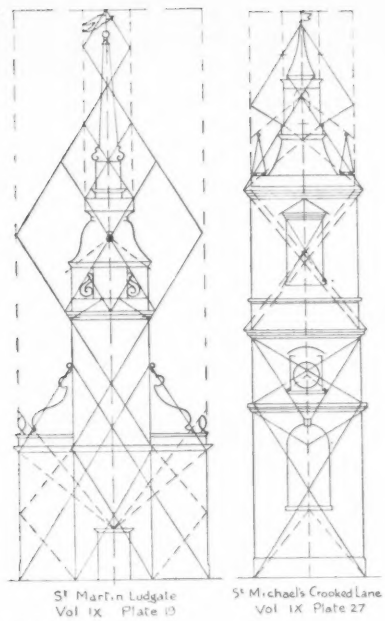
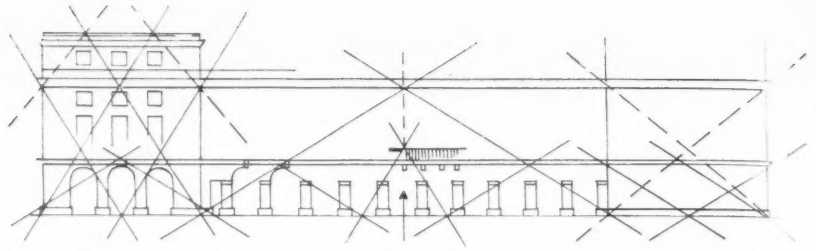
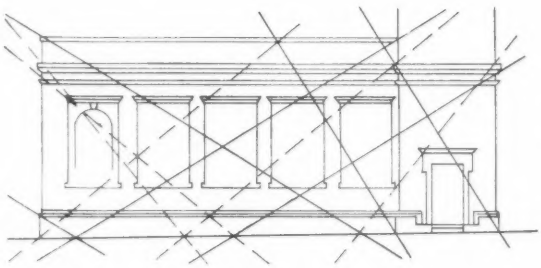


Fig. 12





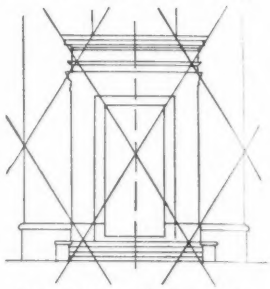


Fig. 13

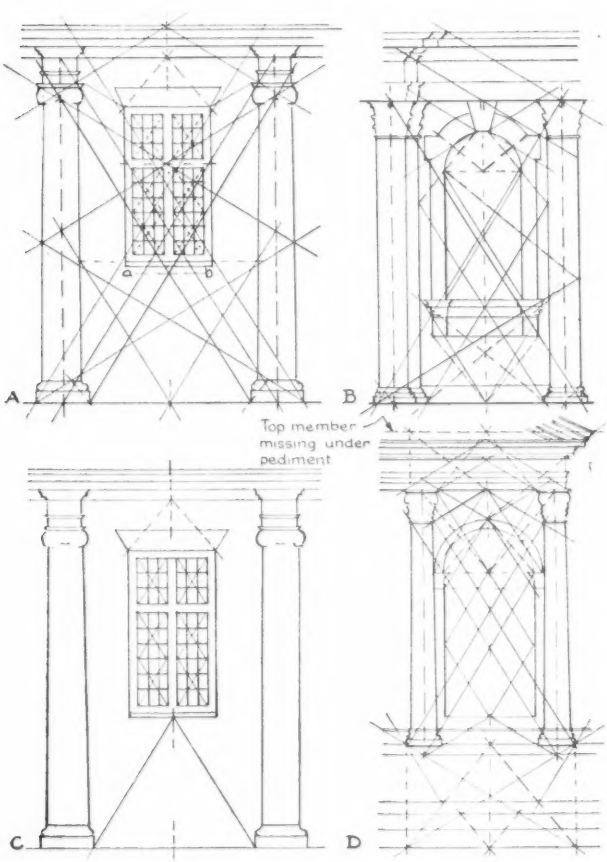


Fig. 14

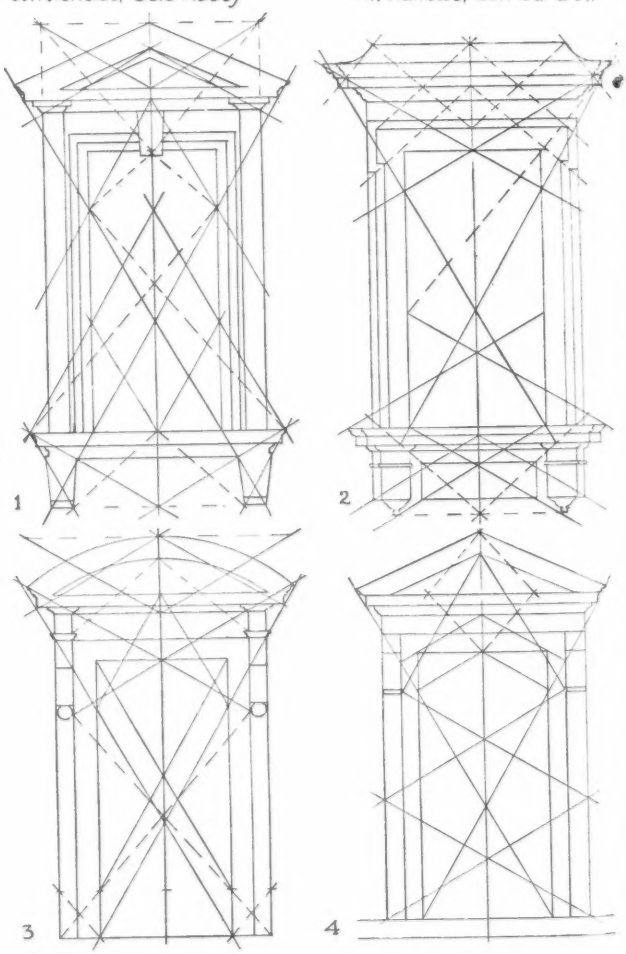


Fig. 15

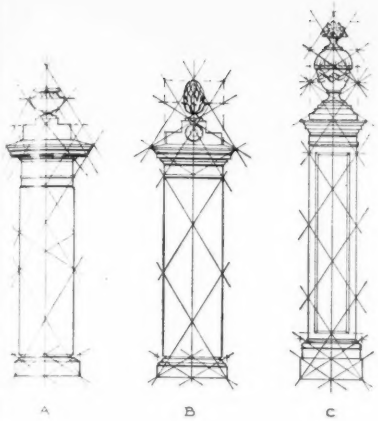


Fig. 16

MAN AND THE GOLDEN RATIO

We began with Man, and we now turn back to Fig. 2 and our proposed line (*a-b*). We set up a new diagram, using a modern drawing of the male figure. It may still seem absurd to suppose that a geometrical scaffolding erected around a man can help with any clue to sound proportion in buildings, but the most sceptical will be interested in ascertaining whether our set squares are capable of giving a more acceptable figure than Leonardo has provided. We select a diagram where proportions are nicely calculated by measurement of the relative sizes of parts, and we take the figure given in *Anatomical Diagrams*, by James M. Dunlop (Bell, London, 1904). This is shown in Fig. 19, and we find it as amenable to treatment as the Parthenon. We observe that our corrected line (*a-b*) is essential to setting it up. If we start with the height of the centre line and put in the first two lines in the order given we have the satisfaction of being able to draw this human figure to any given size by means of our set squares alone, without measuring or dividing anything.

When we are dealing with the little monument we 'transposed' into $\sqrt{2.25}$ and found that its proportions suffered. Such a loss of proportion would clearly be more easily detected in the human figure, with which we are all familiar. Let us transpose our normal $\sqrt{2.618}$ man into terms of $\sqrt{2.25}$ and see what happens. We arrive at B—a super traffic policeman. He would have satisfied neither Vitruvius nor Dürer. $\sqrt{2.25}$ gave a flatter slope than the golden slope; we now try a steeper one and choose $\sqrt{3}$; Mr. C proves a poor candidate for the post of Ideal Man.*

It will be objected that we can hardly expect good results if we use the same method of setting out with other set squares, because if the golden ratio fits that

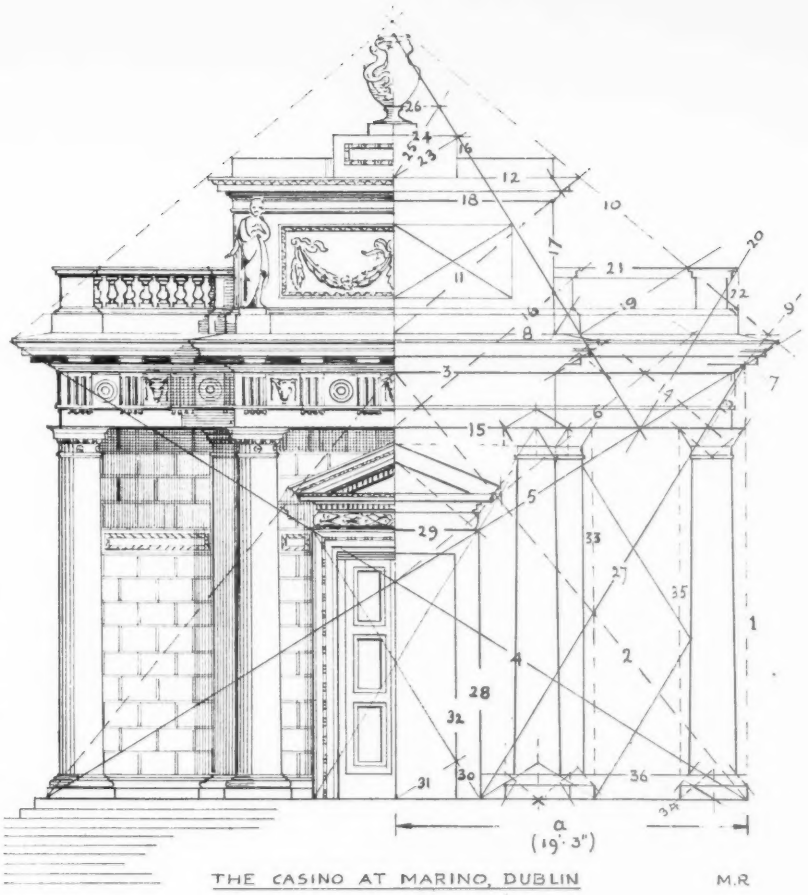


Fig. 17

form of scaffolding *a priori* none other can possibly fit, unless differently set up. We draw the man A again at D and try every means of forming a scaffolding with set squares other than the golden set square—and we fail.* If we return to the golden set square we discover many coincidences that have not previously occurred to us. What can we conclude—except that the golden ratio is the sole key to the setting-up of a man? When we consider that the only proportion which has been constantly before mankind for æons has been that of the human frame, is it so absurd after all to believe that this proportion is sub-consciously fundamental in our minds, and that we recognize it in buildings and objects without realizing it?

Those interested in following up the grotesque may like to know how we should look if Nature had adopted for humanity some proportion other than the golden ratio. Fig. 20 is included for their benefit. We cannot allow our monsters to raise their arms because we have already got into trouble over this in Fig. 19. We might try the Vitruvius-Dürer specification and swing their arms from the navel as a centre to the point (*a*), as on Fig. 2. If we do this we find that A's arms shorten to be in proportion with his stumpy legs, while C becomes a human spider and could easily scratch the top of B's head in our drawing. Taking them, however, as they stand; A would be the ideal coal-heaver, while C would have a terrific turn for speed—a valuable asset to one of his physique. Man appears to be a compromise and to combine both activities—heaving and running. Only unduly short arms prevent A from conforming to the gorilla pattern.

A final trial awaits us. We have ascertained that the golden set square can give us the proportion of Chambers' Casino, and can also give us man. What better test can be devised than to take another of Chambers' drawings—this time showing a Doric arch, *with* pedestal—the Casino had no pedestal. This arch as drawn by Chambers, with his method of setting out by modules, is shown on Fig. 21. We have already seen that the 'module' is half the diameter of the column at its base, and that it is divided into 30 minutes. That

* This is very amusing, but I suggest Manning Robertson's triangulation is at fault here. This would be clearly shown if R's proportioning of man by the combined use of $\sqrt{1}$ and $\sqrt{3}$ set squares (see 'R's Method of Using Ordinary Set Squares', p. 103, in R.I.B.A. Library) were compared with Manning Robertson's diagrams. A. Leonard Roberts.

* I don't agree. See previous footnote.—A. Leonard Roberts.

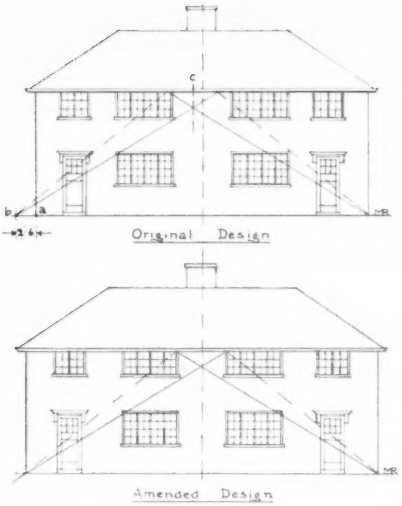


Fig. 18

Chambers had any other setting out in his mind, besides that which he has shown us is unthinkable. What does he himself say of this arch 'if the lowness of the arch should be objected to, it may easily be remedied by increasing the height of the column.' Of arches generally, he advises that 'the void or aperture of arches should never be much more in height, nor much less, than double their width; the breadth of the pier should seldom exceed two-thirds, nor be less than one-third of the width of the arch.' It is certain that Chambers designed what he thought *looked best* and then specified it in terms of modules.

What are the chances that we, ruling four fixed slopes, with our golden set square and its related slopes can specify every point of importance in Chambers' design? They must be many million to one, and yet Fig. 22 shows how all the principal features are dictated by the central figure of our man! There is again no question of approximation here, because the drawing is large enough to show up an error of half an inch in a structure over 14 ft. high. In order to fulfil his task the man has to be our version of the Vitruvius-Leonardo figure. Our set squares have told us how to do this, and Dürer has assured us that we are right by himself using our golden ratio. We also have the support of modern authority in making this amendment.

Neither we nor Chambers specify the *size* of the arch. All we either of us do is to specify the ratio which gives the proportions. When we said the arch was 14 ft. high it was because we assumed our man to be 6 ft. high. This would correspond with a module of $6\frac{1}{2}$ in. If our man were 12 ft. high (remember that he is but an abstraction—a framework of proportion), then our arch would be twice as large.

Having reviewed the evidence what do we decide? In the first place we have avoided the depressing conclusion that the

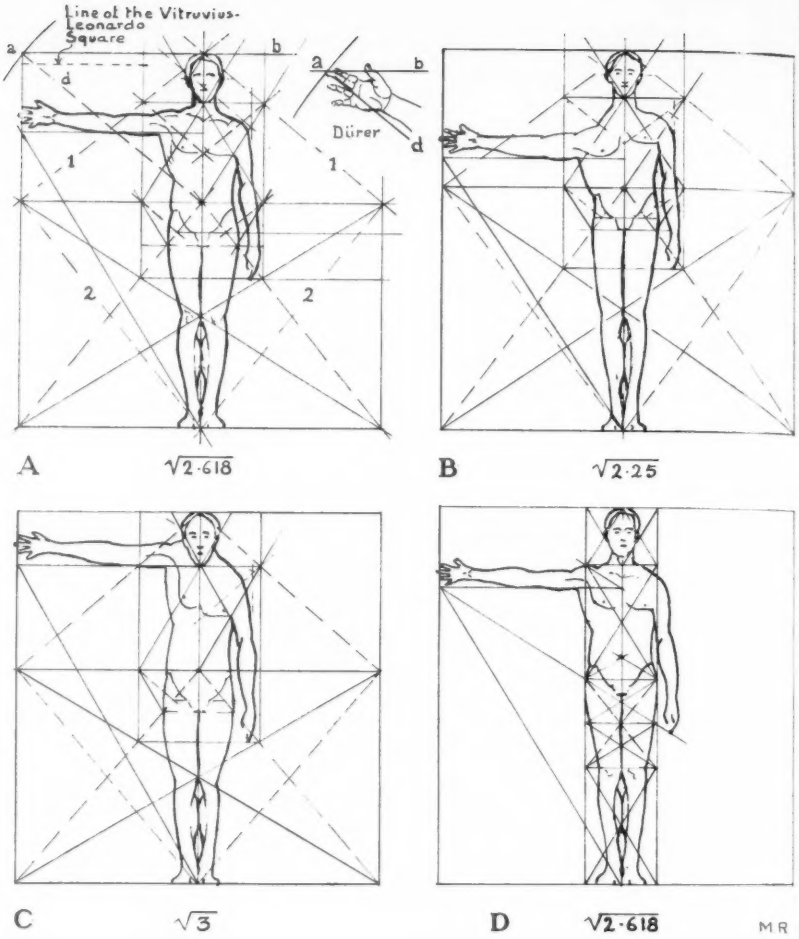


Fig. 19

golden ratio is the only key to good design, but we must surely grant it a very high place. Does it still seem too absurd to agree with the ancient and medieval concept that this is due to our concealed appreciation of the human form? Consider the importance that is attached to the life class in every school of architecture. This is puzzling to the layman, because there is no obvious connection between design in building and in the human figure. The schools of architecture themselves are vague, but if asked, would probably say that the life class is a good training to the eye. Does not the explanation possibly lie much deeper? Is it not conceivable that a capable student absorbs the golden ratio, through the life class, and designs accordingly? This is the conclusion which our set squares would suggest.

As we have stressed, the golden set square and its related slopes allow a wide choice of variation, even within a small design, and these multiply with the complexity of the conception; thus design is protected from undue mechanization. Did we hit upon the truth when we said that they were analogous to musical keys? The common chord, the dominant seventh, and the strictly limited range of final cadences, might lead us to fear that they might dominate the mould of composition—and yet they do not do so.

If a musical man, who had heard and appreciated good music were stranded on a desert island, knowing nothing of notation, he would, if the island had a piano, invent his own notation, and his compositions would at once be recognizable to us, as being in one or other of our keys. He would have arrived at this by trial and error, but he would have composed the same music a great deal faster had he been acquainted with notation. The set squares, giving a geometrical scaffolding, would appear to hold an analogous position and to save an amount of tentative effort, as well as enabling us to transpose a design to any size with a minimum of labour.

It is traditional at the pantomime for the characters to parade before the final curtain. Let us follow this excellent precedent and take a glance at the characters we have encountered. We are by now familiar with the differences between their slopes and the general relationship that exists between

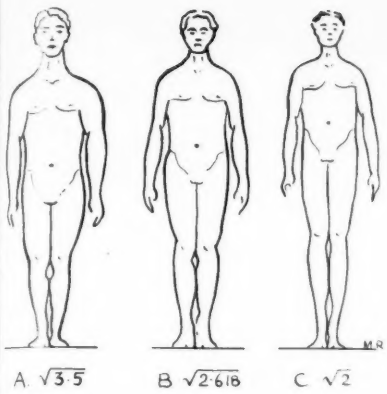


Fig. 20

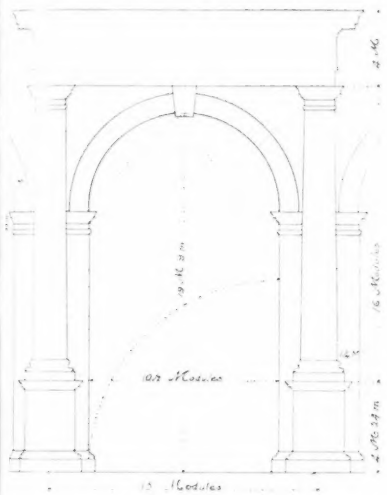


Fig. 21

them. Fig 23. lines them up for inspection, with the golden rectangle in rather stronger emphasis than the others.

We can see why the related slope is as important as the primary slope, because the only slope of the square is the low related slope of the double square. The high slope of the double square is also its high related slope. The slope of the diagonal of a square is its high and low slope as well as its high and low related slope. The virtue of $\sqrt{2.618}$ is clearly visible, and we can understand why Wren, with his fondness for squares, designed in golden proportions; in no other way could he work to a proportion based on squares without restricting himself to the monotony of the 45 degrees angle. Whether or no he did this consciously is only one aspect of the mystery we are investigating.

CONCLUSION

It is at this point that we miss the summing up to which detective fiction has accustomed us, but the reader should now be in possession of sufficient facts to form his own conclusions. It is not the object of this thesis to submit any theory of æsthetics, but to follow facts wherever they may lead. Time and again we have run up against the golden ratio; now and then we have surprised $\sqrt{2}$, $\sqrt{2.25}$, and $\sqrt{3}$, all significant geometrical forms. This is astonishing because there seems to be no obvious reason why the building up from small parts into what *looks well* should lead to any such definite geometrical ratio; still less can we see why the golden ratio—as representing proportion both in humanity and geometry—should hold the dominant position we have been forced to allot to it.

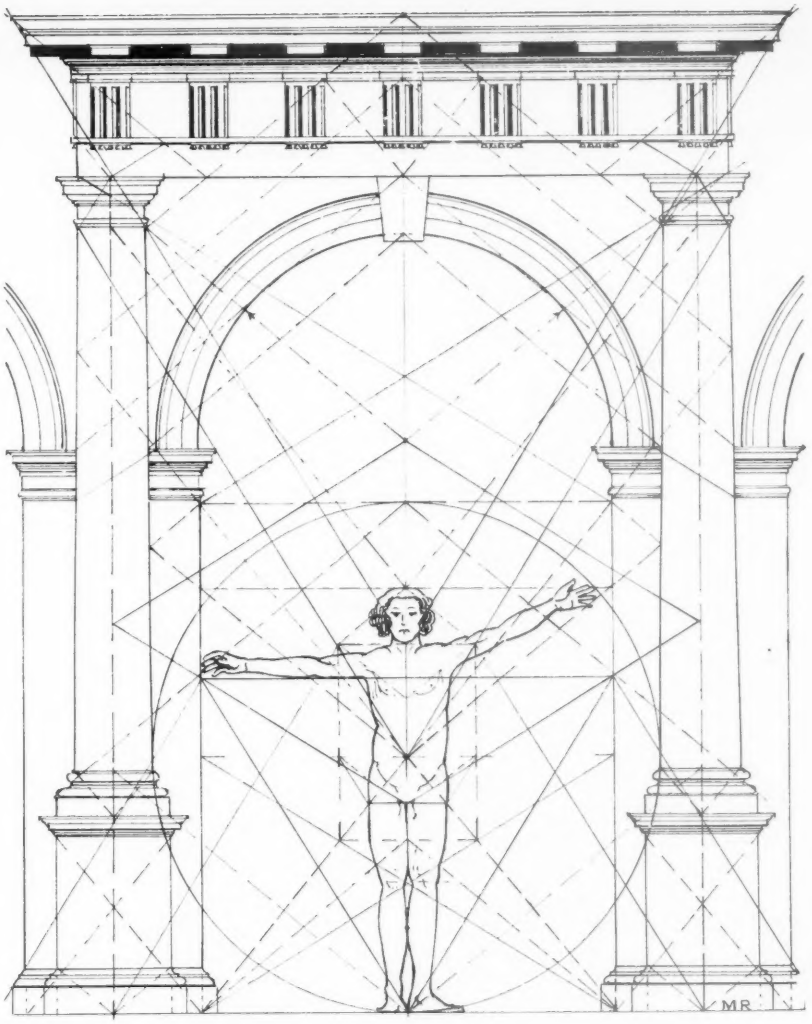


Fig. 22

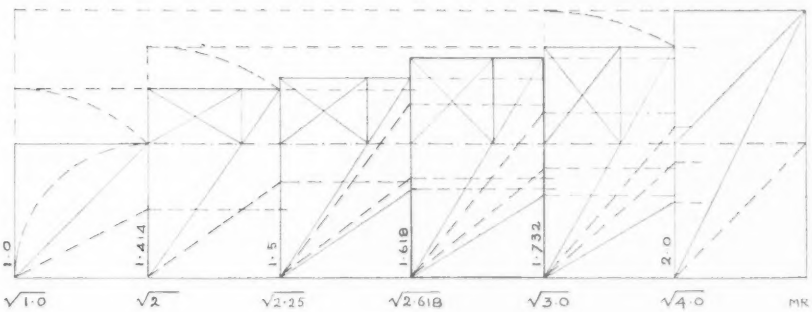
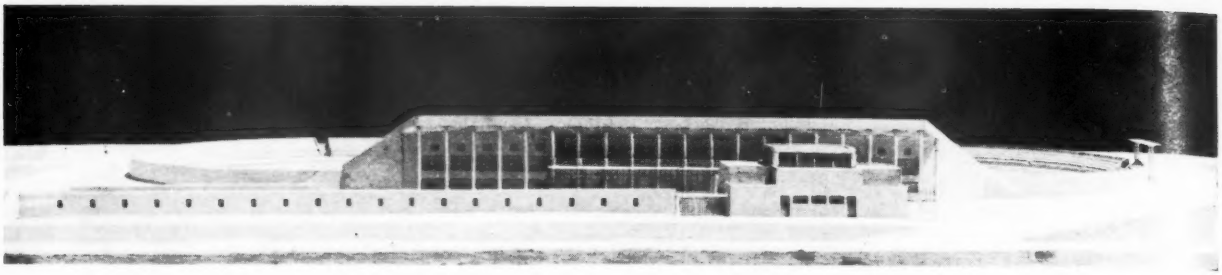
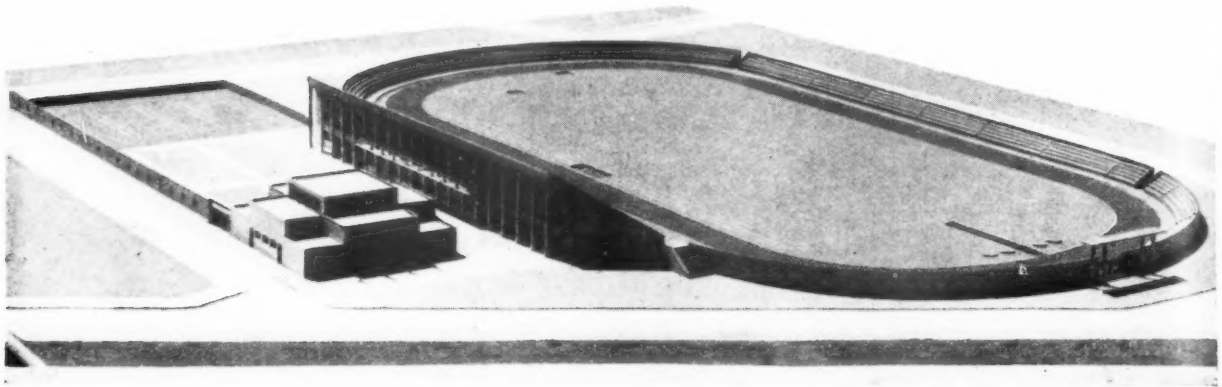
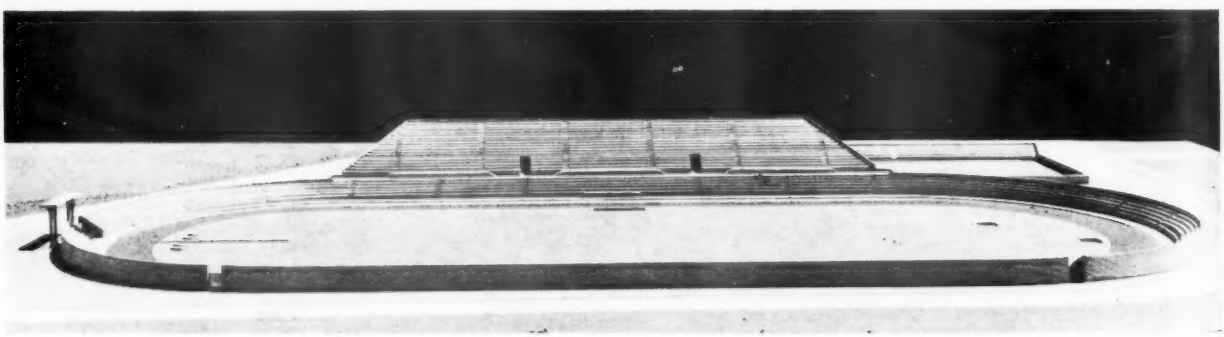


Fig. 23







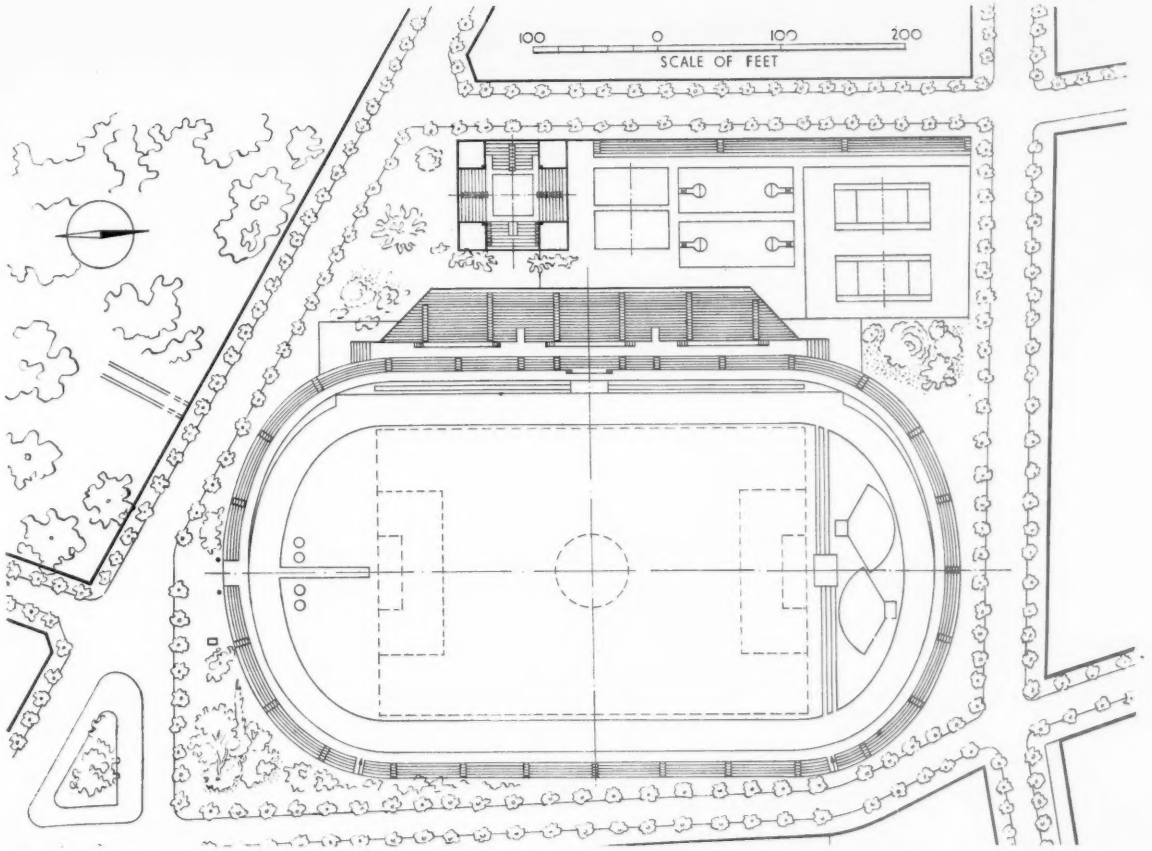
Athletics Centre at Canea, Crete

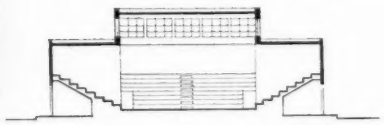
Architect: Patrocle Karantinos. Hon. Corresponding Member R.I.B.A., Architect to the Hellenic Ministry of Education

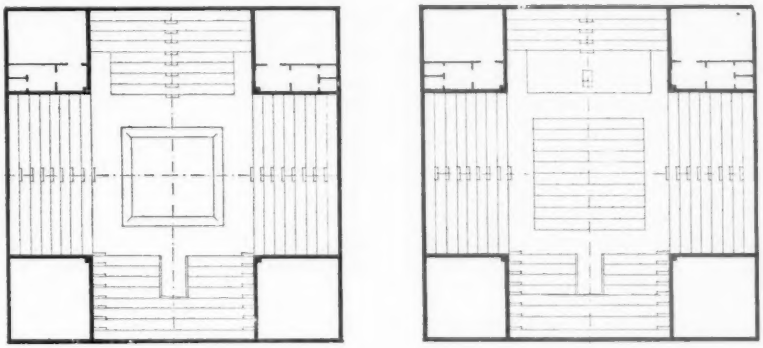
CANEA, THE CAPITAL OF CRETE, has a population of 40,000. The new athletics centre for the town is to be situated near the municipal gardens and associated with the principal school buildings with which it will constitute a single group. The area and the funds in hand are both limited and do not allow the erection of an athletics centre with individual spaces for all kinds of sport. The stadium provides seating for 10,000, has a 400-metre running track and is big enough for football and the usual athletic sports. Attached to the stadium is a secondary area for tennis, basket and volley games with seating for 1,000 spectators. Underneath the main stand building there are an indoor gymnasium with two groups of changing rooms and baths, the administration offices, refreshment room for the athletes and a library. An open loggia is a beautiful and useful adjunct to the stadium.

The subsidiary building is a general purpose auditorium or covered arena in which the seating and staging can be varied for different uses. Primarily for wrestling, the hall can be changed for dancing displays, school ceremonies and concerts and performances of classical drama. The seating is for 700. The interior has clerestory lighting. The necessary service rooms are provided at ground level.

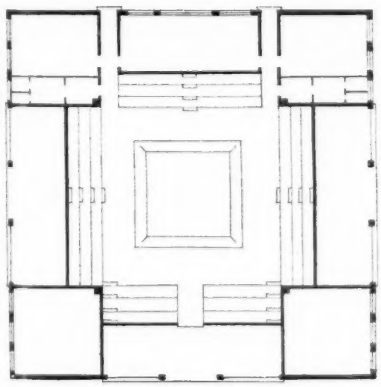
The architect modestly says of his scheme that it is 'small and humble compared with the huge groups of other countries', but says that it represents a 'progressive effort for a provincial town, especially in Greece which, ruined and poor, has not the necessary means for ambitious projects'. It is hoped gradually to erect similar centres in all the towns of Greece.

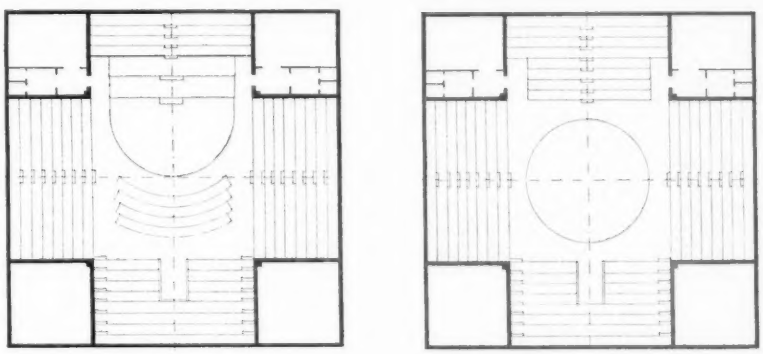






The Athletics Centre at Canea. Top: the layout plan. Below: the lower level plan of the covered arena. The plans on the right show the alternative arrangements for (upper left) wrestling, for (upper right) lectures and concerts, for (lower left) classical drama, and for (lower right) gymnastic and dance demonstrations. The section shows that the lighting is by clerestory





The Cost of House-Building

First Report of the Committee of Inquiry appointed by the Minister of Health

IN JUNE 1947 the Minister of Health appointed a Committee (known as the Girdwood Committee) to consider and keep under review the costs of house-building and to make recommendations. The Committee have now produced their first Report. The members were: Mr. J. G. Girdwood (chairman), Mr. D. N. Chester, Alderman D. H. Daines, L.C.C., Mr. C. H. James [*F*] and Mr. W. K. M Slimmings, C.A. Mr. D. W. Nunn, A.R.I.C.S. was the Assessor. The Report is divided into 11 chapters, followed by six appendices, and a list of those invited to submit evidence or information; they were: the Ministries of Health and Works, R.I.B.A., Royal Institution of Chartered Surveyors, National Federations of Building Trade Employers and Operatives, Association of Building Technicians, Association of Municipal Corporations, Metropolitan Boroughs Standing Joint Committee, Urban District Councils Association, Rural District Councils Association, Edmonton Borough Council, Liverpool City Council, London County Council, Norwich City Council, Winchester Rural District Council, Birmingham Building and Civil Engineering Regional Joint Committee, Messrs. John Laing and Sons, Messrs. George Wimpey and Co., Professor Ian Bowen, Sir Lancelot Keay, P.P.R.I.B.A.

In their introduction the Committee point out that immediately before the war the typical local authority house cost less than £400, whereas at the time of the Committee's appointment the cost had risen to about £1,200; they therefore felt themselves called on to examine this apparent trebling of cost, and they dealt with the problem in three stages: (i) by establishing the facts as to the difference between pre-war and post-war house-building costs; (ii) by analysing the increase and evaluating its component parts; (iii) by considering to what extent and under what conditions a reduction in the present level of costs could be expected. The Committee confined their inquiry to costs in England and Wales, and used the latter part of 1938 and the early months of 1939 as their pre-war datum, and immediately before November 1947 as their post-war datum, that is, just before the increase in building trade wages occurred, coupled with the new scheme of incentive payments. The Report deals only with permanent, as distinct from temporary, houses, and is here summarized as follows.

Chapter 1. The background. During the years 1919-1922 high building costs were a dominant feature, houses were in demand, and the Government passed the Housing, Town Planning, etc., Act 1919, placing on local authorities the duty of providing dwellings for the working classes, giving them a subsidy, and granting lump sum payments to private builders, under certain conditions. In January 1920 the average area of local authority houses was 882 sq. ft. and 884 in January 1921. About 1926 the size fell below 800 sq. ft.

By 1923 the low level of building costs enabled private enterprise to build houses without State assistance, and by the Housing Act 1923, which granted a subsidy of £6 per house for 20 years to local authorities and private builders alike, the building of working class houses was stimulated. In the period 1930-39 costs continued to fall during the first five years, notwithstanding an increase in building from 218,000 houses to 313,000; the lowest point was reached in January 1935, when tender prices for local authority three-bedroom houses averaged £293, or 7*s*. 10*d*. per sq. ft.

War-time preparations and operations, 1939-45, stopped house-building in general, but 3,000 agricultural cottages were put in hand at the instance of the Government, in 1943; these were provided by local authorities. Then in 1941 a start was made on the planning of the post-war programme, and a number of bodies were set up under the Ministry of Health's Central Housing Advisory Committee, including the Dudley Committee on the design of dwellings, committees on private enterprise housing and rural housing; house construction, the placing and management of building contracts, the use of standards in building, and Codes of Practice for building and civil engineering work. 'Post-war Building Studies' were published by the Ministry of Works, the first was one on house construction, in 1944, being the report of what is known as the Burt Committee. Then came the Housing Manual 1944, incorporating many of the recommendations of the Dudley and Burt Committees.

Demonstration houses were erected at Northolt during 1943 and 1944, and by 1945 a number of different systems of permanent house construction had been approved and had reached the production stage. Then came the post-war situation, 1945, when it was estimated that 750,000 dwellings were needed to give every family a separate home, and that 500,000 more were required to replace houses already condemned as unfit; a far larger number being required over a longer period to make good the wastage of worn-out houses and to satisfy the demand for better accommodation. The building industry had shown itself capable before the war of building houses in large numbers and at a low cost; local authorities had 20 years' experience behind them, and it was anticipated that they would be able to undertake a substantial housing programme. On the other hand, the strength of the building industry had been seriously depleted, dropping by 66 per cent, from the 905,000 in July 1939, to 311,000 in July 1944, but rising to 407,000 in July 1945.

In 1945 the production of most building materials and components fell short of the pre-war level. The restoration of full output in many districts was dependent on sufficient man-power, fuel and raw materials, and could not be attained at once. Further, practically all the materials used in house-building are also required for other purposes, so housing could not expect to enjoy the sole benefit of any increases in production. By 1945 the general wage rates had increased by 49 per cent over the pre-war level, and wholesale prices by 66 per cent; the cost of living index rising to 31 per cent above 1939. Building trade wages were up about 45 per cent and materials by about 80 per cent, and the cost of building was 90-100 per cent above the level of 1939.

The resemblance between these conditions and those prevailing after the 1914-18 war are apparent, but the following points of difference may be noted: (i) the greater degree of efficiency attained by the building industry by 1939, when house-building was at its peak, as compared with the low level in 1914, and the greater housing experience of both Government and local authorities; (ii) the intensive preparatory work carried out between 1942 and 1945; (iii) the volume of war damage in 1939-45, and (iv) the longer duration of the second war.

The immediate objectives of the post-war housing programme were stated in the Coalition Government's White Paper of March 1945, which set a maximum target of 300,000 permanent houses built or building by the end of the second year after the end of the European war. When the present Government took office in July 1945, policy was concentrated on the provision of permanent houses by local authorities. Financial provisions were made in the Housing (Financial and Miscellaneous Provisions) Act of 1946, which provided a substantial Exchequer subsidy of a fixed amount for each house built by local authorities, with supplementary contributions from the rates. The standard Exchequer subsidy was £16 10*s*. per annum for 60 years, and a normal rate contribution of £5 10*s*. for the same period. Special provision was made for houses for the agricultural population, for housing in poorly-rated areas, for flats on expensive sites, and to meet extra costs incurred on sites liable to mining subsidence. As the amount of the Exchequer contribution was fixed, any increase in the cost of providing houses could be met only

by increased rents or by additional rate contributions, or a combination of both.

Chapter 2. The increase in house-building costs, 1938-39 to 1947. As the basis of comparison of the cost of house-building before and since the war, three-bedroom houses of traditional construction built under contract for local authorities were taken, as being most nearly comparable in type, and representative of houses built in large numbers in both periods. In 1938-39 the average price was 9*s*. 4½*d*. per sq. ft., including the house, paths, fences, drains, gas, water and electricity services within the curtilage of the house, but excluding the cost of land, roads and main services outside the curtilage, and professional fees. At the end of 1938 the average size was 800 sq. ft. and at a cost of 9*s*. 4½*d*. per sq. ft. the tender price would be £375 per house. Contracts for these houses were on a lump sum basis, with no provision for variations on account of changes in building trade wages or in the cost of materials, but the final cost generally included slight extras due to variations during the course of the work, the average cost of these extras was £5, bringing the final cost up to £380, or 9*s*. 6*d*. per sq. ft.

Houses completed in October-November 1947 were tendered for about the middle of 1946, when the average tender price for three-bedroom houses was 22*s*. 9*d*. per sq. ft., and the average size 1,029 sq. ft. including an outbuilding of some 95 sq. ft. As there was no change in wages during the period of these contracts no extras were incurred on that account, but softwood went up by about £20 a standard; prices of other materials also rose, and all these amounted to an average extra of some £40 per house. Overtime, guaranteed time, travelling and subsistence allowances were extra to the tender prices, and averaged about £12 per house. An estimated extra of £20 per house was caused by adjustment of prime cost amounts and provisional sums, variations, and extra cost of substituted materials. The average final cost was therefore: amount of tender (1,029 sq. ft. at 22*s*. 9*d*.) £1,170; increased cost of materials subject to the price fluctuations clause, £40; guaranteed time, travelling, subsistence, and overtime, £12; general variations £20; total cost £1,242, equivalent to 24*s*. 2*d*. per sq. ft. Thus the typical three-bedroom house of 1938-39 cost approximately £380 to build, and its counterpart in 1947 cost £1,242; an increase of £862. Site development charges and cost of land were not included in the foregoing estimate, but were taken as £122 4*s*. average; where a private architect was employed his fees ranged from £26 5*s*. to £8 12*s*. per house, according to the size of the scheme; quantity surveyors' fees averaged £12 per house, so where these services were used the full cost was: building cost £1,242; land and site development £122; quantity surveyor's fees £12, architect's fees, say, £24; total £1,400.

Although architects' fees thus appear in the cost of houses only where a private architect was employed, it is clear that expenditure of a corresponding kind will be borne by the local authority wherever its own architectural staff is employed. Similar expenditure arises in respect of other technical and administrative staff employed by local authorities, and costs under this head have increased considerably since the war, owing to the expansion of the housing work of local authorities.

These figures are based on averages and do not reveal the wide range of difference which exists on either side of the average. The cost of house-building is influenced by many variable factors, and it should therefore be borne in mind that the figures of costs quoted in the Report are calculated or estimated averages drawn from very diverse data, and that in practice the cost of houses varies widely above and below the average, according to circumstances.

Chapter 3. Analysis of the increase in house-building costs. The factors leading to the increase in house-building costs may be grouped under three main heads: A. Changes in size, construction and equipment; B. Direct increases in building costs; C. Decline in the productivity of the building industry. The effect of all these factors is cumulative, since the 1947 house, besides being larger, is built to better and more costly standards by higher-paid labour using materials at increased prices, and working at a lower level of productivity. The Report summarizes this chapter thus: the typical local authority three-bedroom house of 1938-39 cost £380; in 1947 it cost £1,242, that is, three-and-a-quarter times as much. The average size of such houses just before the war was about 800 sq. ft.; in 1947 it was 934 sq. ft. plus an outbuilding of 95 sq. ft.; total floor area 1,029 sq. ft. The increased size of the house and the addition of an outbuilding account for £201, or about one-sixth of the total cost. Improvements in construction, finish and equipment, £127, about one-tenth of the total cost. Cost of labour increased by £297 per house, made up of £96 for increased rates of wages and other emoluments, £75 for the improvement in standard, and £126 for decline in productivity since 1939. The total cost of labour per house was three-and-a-half times the pre-war amount.

The total cost of materials increased by £472 per house, of which £284 was due to increased prices and £188 to the extra materials required for the post-war house. Overhead charges and profit caused an additional cost of £77 per house. In brief, the typical local authority house of 1947 cost some three-and-a-quarter times as much as its pre-war counterpart and required twice as much labour and one-third more material to build. The estimated total increase in man-hours worked per house due to all causes (comparing the 1947 total of 3,034 with the 1938-39 total of 1,550) was 1,484, or 96 per cent. This would imply that at 1947 output and 1947 housing standards, a housing labour force equal to that existing before the war would be able to produce in a year only about one-half of the number of houses built in 1938.

Chapter 4. The implications of the increased size and improved specification of the post-war house. During the five years 1934-38 the majority of three-bedroom non-parlour houses built by local authorities were between 750 and 780 sq. ft. in area, and it was not until late in 1938 that they increased to 800 sq. ft. Since the end of November 1945 the size of houses has risen steadily above the Ministry of Health's recommended minimum of 900 sq. ft. The average area, including outbuildings, of houses in tenders approved in March 1948, was 1,062·6 sq. ft. The Dudley Report assumed that building costs would be stabilized at about 30 per cent over the pre-war level, but the actual increase up to November 1947 was of the order of 140 per cent, so not only has the cost of the improvements been much higher than was anticipated, but the cost of the typical pre-war house, without the improvements, has risen from £380 to £914. The increased size and more elaborate equipment of the average post-war house accounts for some 25 per cent of the total number of man-hours required per house. The bulk of evidence heard by the Committee indicated that the provision of a second W.C. in a three-bedroom house has a cost disproportionate to its value to the tenant.

Although the Committee did not consider it was within their province to examine the merits of the improvements in housing standards that have taken place since 1939, they felt bound to stress the high cost in money, labour and materials resulting from their introduction immediately after the war. They emphasize the extent to which this factor has contributed to the increase in house-building costs, as it has been the largest single item in the increased cost which is subject to Government influence. They considered it appropriate to recommend that policy regarding the standards of accommodation and equipment of new houses should be reviewed afresh in the light of present-day conditions.

Local authorities and other witnesses have stated that of the houses now being provided an undue proportion is of the three-bedroom type, and that there is need for more two-bedroom houses. Many of the applicants for new houses would be satisfied with two bedrooms, especially as the rents would be lower. This would suggest that some existing three-bedroom houses are being under-occupied by small families, and that accommodation for larger families could be released if more two-bedroom houses were available. In view of the great savings, in cost as well as in labour and materials, which could be obtained by building more two-bedroom houses the Committee think it important that local authorities should be free to provide such houses to the full extent that local needs permit. More two-bedroom houses are in any case likely to be needed now that the temporary house programme is coming to an end.

Chapter 5. The cost of building. By October 1947 the wages of building trades labour employed on house-building, including additional insurance and holiday contributions, had increased by some 69 per cent over the pre-war level. Guaranteed and travelling time, travelling expenses and subsistence allowances, added a further 13 per cent. At the same time materials had in-

creased in cost by about 125 per cent over the 1939 level. Overhead charges have increased since the war, on account of the prevailing abnormal conditions, such as difficulties in getting labour and materials, complying with the various controls, and the numerous and detailed forms, records and returns now required, necessitating a staff with higher qualifications and higher salaries. There is no evidence that the margin of profit has been inflated by price rings among building contractors, and the increase in the amount required for the combined item of overhead charges and profit has been due to the greater cost of overheads rather than to an increase in profit.

After September 1920, when building prices were at a peak, they fell, and the question is whether a similar trend may be expected. The conclusion reached after a comparison of the experience following the two world wars is that (i) the cost of building followed the general trend of wholesale prices and wage rates in both post-war periods; whereas after the 1914-18 war both wholesale prices and wage rates fell during the third year, they have continued to rise during the third year after the second war; (ii) wholesale prices and wage rates fell after the 1914-18 war because there was a slump and a decline in the prices of imported raw materials and foodstuffs.

It follows that house-building costs cannot necessarily be expected to decline within any given period after the end of the war. On the contrary they are likely to conform with the general level of prices and wages, which at the time of writing showed no sign of falling. The policy of full employment is intended to exclude the possibility of a slump such as occurred after the first world war. Whether import prices, which are governed by world factors, will decline in the near future remains to be seen. If they should continue to rise, the cost of building will tend to rise also. There seems to be no ground for assuming that if and when prices fall they will return to the pre-war level.

Chapter 6. The problem of productivity. The decline in the productivity of the building industry since 1939 led to an increase of some 45 per cent in the average number of man-hours needed to build a house in 1947 with a resultant extra cost of about £150 per house. This increase in man-hours is equivalent to a 31 per cent decline in output. This decline is one of the main elements of the high cost of building which offer any scope for reduction. The causes of the decline in output are various and complex; it is not solely due to lack of personal effort, nor is it peculiar to house-building. A lack of materials on the site, due to shortages, has meant either that operations have had to be suspended or that labour and plant had to be employed unproductively while supplies were awaited. Irregular supply of materials has had an adverse effect on the organization of work on sites; the normal rhythm of work has been upset and time has been wasted in moving men and materials from one job to another.

The shortage of labour is shown by Ministry of Labour returns: in June 1946 there were vacancies for 19,650 craftsmen and 12,051 labourers; by December 1947 the figures were 15,007 and 12,279 respectively, the principal shortages among craftsmen being bricklayers, carpenters and plasterers. These shortages led to a lack of balance in the labour forces on housing sites, and have had the same adverse effect on output as have the shortages in materials. Under conditions of full employment, and with a general demand for labour, the building industry has not been able to command the same quality of labour throughout as was possible before the war, when the existence of considerable unemployment provided a pool of labour from which the best men could be drawn.

The wasteful use of labour engendered by the widespread use of the 'cost-plus' system has had long-term effects on building productivity. Men returning to the building industry from the Forces showed a comparatively high level of efficiency initially but their output fell after they had worked for a time on housing sites. The Payment by Results scheme introduced as a condition of the Essential Work Order 1941, led to the fixing of basic rates of output at a time when most of the work concerned was being carried out under cost-plus contracts, on which output was low, and when the physical and technical standards of the men employed were poor owing to the call-up or transfer to other industries of the fitter and younger men. The combination of these two factors necessitated the setting of a low standard of basic output which has tended to perpetuate an unduly low standard of production since the war.

In the light of events it is clear that the volume of house-building started in the two years after the end of the last war, together with the amount of other building work put in hand, was much too great for the resources available to the building industry. This resulted in too thin a spread of labour and materials over the amount of work in progress and has thus been largely responsible for the low level of productivity in house-building in the past, and the extra cost arising therefrom. There is sufficient evidence to show that post-war productivity will not be restored unless those engaged on house-building can be assured of work on the sites progressing smoothly and without interruption, with adequate and regular supplies of materials and fittings and a balanced labour force.

There is now ample work in prospect, and the competent worker should feel assured of security of employment for many years to come. There is need today for more emphasis on positive incentives, on rewards rather than penalties, on the importance of pride in craftsmanship and a sense of partnership between management and men, and on the value of good working conditions and proper welfare facilities on building sites. This change of emphasis found expression in the agreement reached by both sides of the industry in October 1947 regarding the introduction of incentive payments. The changed conditions since the war have underlined the need for good personnel management in the industry, and the subject deserves further study by contractors. Some of the causes of the decline in productivity are indicated in this chapter, but it is made clear that a serious factor has been the lack of individual effort, and until this problem of personal effort is solved output cannot be satisfactory and loss of productivity is inevitable. It is possible that there should be more grading of craftsmen and labourers, and more opportunities for labourers to improve their status.

Chapter 7. Housing contracts. Since the war the great majority of local authority houses have been built under fixed price contracts based on bills of quantities, with provision for price fluctuations and adjustments for variations. Under the special conditions prevailing since the war it is considered that bills of quantities have afforded the best method of obtaining satisfactory tenders for housing contracts, as they make for more accurate prices, closer tendering and keener competition for housing contracts than would otherwise have been possible. They have had the further advantage of facilitating the ordering of materials and the placing of sub-contracts.

There appears to be general agreement as to the desirability of discontinuing the use of the price fluctuations clause and of reverting to the normal system of lump sum tendering, as soon as circumstances permit. The Report endorses this view, and is of opinion that some limitations of the scope of the fluctuations clause is already called for. It is recommended that in future contracts the fluctuations clause, so long as it remains in use, should be confined to a small number of price-controlled materials, constituting an appreciable proportion of the total cost of materials, and that the only increases or decreases allowed should be those arising directly from officially authorized changes in controlled prices since the date of tender.

Available evidence has shown that there is no reason to believe that direct labour is more economical than building under contract; it can compete with contract work only where there is an efficient and experienced direct labour organization and competent supervision, including careful attention to costing.

Chapter 8. New methods of construction. Over 25 different types of non-traditional permanent houses have been approved by the Ministry of Health, since the war, for use by local authorities. By the end of March 1948 tenders for 99,903 such houses had been approved and 33,570 completed. These have offered no solution to the problem of high building costs.

Chapter 9. House-building by private enterprise. In the absence of comparable data, the Report is not in a position to state that private enterprise has been able to build houses more cheaply than local authorities or their contractors, despite the apparent discrepancy between the maximum selling prices and the average cost of local authority houses, but there is some evidence that private enterprise has achieved a faster rate of building. During the second half of 1947

local authority houses were taking an average of 14·5 months to build, and private enterprise 11·2 months, but these figures may not reflect a true comparison of the speed of completion, owing to differences between the types of houses built by the two agencies, nor does it necessarily follow that the faster rate of building would have been maintained if the share of the house-building programme allocated to private enterprise had been as large as that undertaken by local authorities.

Chapter 10. The effects of high house-building costs. The Report has dealt mainly with the cost of building a typical local authority house, but has thought it relevant to look at the general problem under two heads: (i) the effect of the increased capital cost of houses on the level of rents, and (ii) the demand on national resources which house-building in England and Wales, whether subsidized or not, is making or seems likely to make, and the finance which the central and local Governments may have to find for subsidies. Rents at 1947 levels of prices and productivity were 14*s.* 4*d.* per week. Rising costs have led many authorities to make additional rate contributions, to avoid raising rents; but rents of 16*s.* per week have been charged for post-war three-bedroom houses; some even 25*s.* per week.

In 1938 the expenditure on house-building was of the order of £136 million, equivalent to 2·9 per cent of the national income for that year. In 1947 it was 1·8 per cent, but only 37 per cent of the number of houses built in 1938 were built in 1947. For the first three months of 1948, the figure would be about 2·6 per cent of the estimated national income, but for only 56 per cent of the 1938 number of houses. The Report states that in any review of the housing programme, the wider financial implications of building houses—most of them ranking for subsidy—of the sizes and standards that now obtain and at the present level of cost, must be kept prominently in mind.

Chapter 11. Summary of Report and conclusions. This chapter gives the most important points brought out in the previous chapters.

Graphs and tables show the number and the price of houses built between the two wars and after the last; housing progress, and general statistics. The Report is published by H.M. Stationery Office, price 1*s.* 3*d.* net.

In Germany Today

The Reconstruction Problem

By H. Hinchcliffe Davies [*A*]

Editor's Note. *This article should give British architects some idea of the immensity of the problem of reconstruction in the British Zone of Germany. It is reprinted by permission from the* BRITISH ZONE REVIEW, *The author, Mr. H. Hinchcliffe Davies* [*A*], *is Deputy Controller-General, Building Industries Branch of the Control Commission for Germany. His reasoned statement reveals that the housing and reconstruction problems of Britain are almost trivial compared with those of Germany. He says that a period of* 25 *years has been suggested as a reasonable one for the reconstruction programme, but his facts and figures appear to show that this is unduly optimistic and that there is little likelihood of either sufficient labour or capital being available from Zone sources to allow the work to be done within that time.*

THE HOUSING PROBLEMS of the British Zone were the subject of an article in the April issue of the BRITISH ZONE REVIEW. In this number the larger problem of all physical reconstruction and the length of time it would need will be considered.

There is no precedent in history that can serve as a guide in calculating the length of time the reconstruction will take. Cities have been obliterated and countrysides have been laid waste in the past by earthquakes, floods, conflagrations and war, but never before have the buildings occupied by so large a population as twenty millions, with a Western standard of living, suffered such devastation.

Twenty-five years has often been suggested as a reasonable period for the reconstruction programme. The implications of such a programme can be examined, and its feasibility judged.

The cost of reconstructing the buildings and civil engineering works destroyed or damaged by war in the British Zone is estimated at 22 thousand million Reichsmarks, with an additional 840 million for the debris clearance, at 1939 values and costs.

The question of what proportion of the total annual income of the Zone can be spared for reconstruction is not one that can be dealt with in this article; it is altogether too vast a subject. But even if unlimited funds were available there would still be the limitations of coal, raw materials, transport and manpower, and these we can investigate on the basis of present knowledge.

There are many factors that have to be taken into account. There is the debris clearance, which must proceed concurrently with the reconstruction during the initial period. There are the arrears of building existing in 1939 owing to the Nazi concentration on war-building, and the further arrears of new building and maintenance that have accumulated since then. Also there are the additional buildings that are required for the increased population of the Zone, and there is the normal repair and maintenance work and the rebuilding of worn out buildings that must go on irrespective of the reconstruction. All these requirements will have to be dovetailed together.

Debris clearance is a fairly easy calculation. The quantity to be cleared in the Zone is about 200 million cubic metres. Experience shows that one man can clear on the average a little more than one cubic metre per working day. To move the whole lot in, say, ten years, would require an average labour force of about 70,000 men. If it were all moved by rail it would need 370 fifty-truck trains every working day.

Reasonably reliable figures are available for housing. Altogether the pre-war shortage, the dwellings destroyed or damaged, and the new requirements for refugees give a total buildings volume equivalent to about 3,700,000 new dwellings.

There are no reliable figures for the destruction to non-domestic building. Pre-war statistics suggest that about 40 per cent of the capital value of existing building was domestic and 60 per cent was non-domestic construction, including civil engineering. Non-domestic construction did not suffer from the war in the same proportion as dwelling accommodation, because most of it was considerably less destructible. It is reasonable to assess the destruction to non-domestic building at about two-thirds of the destruction to housing. When the requirement in industrial, agricultural, public, and other buildings to meet the needs of the increased population is added the total works out at a building volume equivalent to the construction of about 2,100,000 new dwellings.

Housing and other building requirements together give a total of 5,800,000 which we may call dwelling-unit equivalents. At pre-war rates of output in Germany this volume of building would involve about 8,700,000 man years of labour; that is, an average force of nearly 350,000 men if the job is to be done in twenty-five years.

It must be emphasized that that is only an estimate, based on the facts as at present known and on a number of assumptions, some of them very broad ones. No allowance has been made for the work that has already been done, but so much of it is first-aid rather than reinstatement, and of the balance so little has been essential reconstruction, that it is not considered that the total programme is materially reduced. The requirement for repair and maintenance and the normal day-to-day replacement of worn-out buildings has still to be taken into account.

In most countries of Western Europe normal building and maintenance employed in peace-time is on the average one-fortieth of the total population. For the pre-war population and the pre-war buildings of the Zone this would be a little under

500,000, but the figure can be reduced to 400,000 to allow for the 20 per cent reduction in the number of buildings caused by the war. The requirements will rise gradually, as the work of reconstruction proceeds until, at the end of the period it will have risen to 575,000, that is, one-fortieth of the population, assuming that the population is the same in twenty-five years as it is now.

Some allowance must be made for the arrears of maintenance that have accumulated during the last eight years. For the purpose of this study a conservative allowance of 200,000 man-years can be assumed which, spread over five years would call for a labour force averaging 40,000 men.

All the manpower figures calculated thus far have been average figures. To achieve an average, starting and finishing with comparatively low figures, means a peak much higher than the average. The peaks of the different sections of the programme would, however, dovetail together to a certain extent with one another and with the ascending curve of normal maintenance.

A large increase in the total building labour force from its present strength of about 500,000 to a maximum of 900,000 in five years will be necessary, if the reconstruction is to be finished in twenty-five years.

The first problem then is whether or not it is physically possible for the German authorities to transfer from other employment 400,000 men, half of whom—if traditional building methods are to be followed—would need to be skilled.

The apprenticeship system serves normally only to replace the annual wastage (about 5 per cent) in craftsmen and thus to maintain the strength of the industry. It could not be geared up to produce three or four times as many and in any case would be too slow. For the purpose of reconstruction a rapid increase of strength would additionally be required; it might be achieved by special training, say an intensive six months course in a building school followed by eighteen months practical work with a builder. To turn out 200,000 trainees in five years would call for the establishment, staffing and equipping, before the start of the five years, of about 120 schools each for 250 men. It is not impossible, but it is highly improbable that this could be done quickly enough to reach the target.

Even supposing the building labour force could be expanded at the rate, and to the size required, there is still the problem whether the Zone could afford to have so many men employed on building. Building is essentially an industry of able-bodied males. Before the war the proportion was one building worker to approximately ten other manual workers. Under present conditions a force of 900,000 building workers would mean a ratio of one building worker to about five others, since the proportion of able-bodied males to total population in this Zone is considerably lower than in pre-war days. The five others would have to see to transport, food production, the export trade and indeed to all other production and distribution. It is a fairly reasonable conclusion that the Zone could not afford to have one in six of its fittest men employed on building.

The question of the probable availability of materials can also be examined. Broadly speaking, a force of 900,000 building workers would use 80 per cent more materials, than a force of 500,000. In normal times the average building worker used three times as much building material as he did in 1947, because his output was three times as great. If it is assumed that the 900,000 building workers will achieve the pre-war output rate, they will use five times the materials that were used in 1947, and that means, so far as what are known as the stones-and-earths materials are concerned, that the building material factories will need five times as much coal as they were allocated in 1947.

Before the war the annual consumption of sawn timber in building work in the British Zone was probably about 5½ million cubic metres. For a twenty-five year reconstruction programme about 9 million cubic metres per annum would be required. The present total annual production of sawn timber in the Zone is reported to be rather less than two million, for *all* purposes; since the forests are diminishing it is unlikely that production will be increased. Most of the nine million would therefore need to be imported, from other zones or from abroad. At present all Western Europe is suffering from a shortage of timber.

Calculations of requirements in constructional steel, builders' equipment, hardware, wood pulp for roofing felt and the other essentials for building all result in similar answers; nearly twice the pre-war quantities to be provided out of depleted indigenous resources or by import.

The transport prospects are equally depressing. In peacetime nearly one-sixth of all the goods carried by the railways were materials for building. The rail transport requirements for the peak of the twenty-five year reconstruction programme work out at about 36 million tons a year, apart from debris clearance which may involve anything up to 18 million tons per annum. For comparison, last year the total quantity of *all* goods carried by the railways of the Zone was 98 million tons.

It would seem then that the requirements of a twenty-five year reconstruction programme, in terms of man-power, materials and transport are greater than the Zone is likely to be able to meet. It is true that materials might be imported if there were enough exports to pay for them; the transport system might also be built up, by the import of rolling stock, to cope with the increased demand; but there does not seem to be the least likelihood that the labour requirements could be met from zonal sources.

The calculations leading to this conclusion have been based on pre-war rates of output and pre-war constructional methods. It is not impossible that new materials and new techniques may bring about a substantial reduction in the coal, timber, transport and manpower requirements of building, but it would need to be a very substantial reduction indeed to enable the job to be done in a quarter of a century.

Building research has not been neglected in Germany, and new processes have been evolved which are claimed to effect substantial economies in man-hours and in the key materials, but so far nothing has emerged that seems likely to effect the complete revolution in building technique that the reconstruction problems of Germany demand.

The solution may be found not in one single invention but rather in the combination of many separate devices and substitutes. All the inventions of scientists and technicians will be fruitless unless the building industry is prepared to forsake its traditional conservatism and to learn new methods and the use of new materials. This applies equally to the architects, they must learn to design the new buildings, to take advantage of the new building techniques, and of mass-production.

The Town and Country Planning Association

On the 6th of this month the Association gave a dinner to celebrate the 50th anniversary of the publication of Sir Ebenezer Howard's book *Garden Cities of Tomorrow*, and also to present Mr. Richard L. Reiss with the Howard Memorial Medal, in recognition of his distinguished services in connection with Garden Cities. Mr. F. J. Osborn, chairman of the executive, occupied the chair. Mr. Herbert Morrison proposed the toast of The Garden City Movement and the Memory of Sir Ebenezer Howard, recalling that Howard had his thoughts turned towards the creation of garden cities by reading Edward Bellamy's *Looking Backward*.

In replying to the toast, Sir Patrick Abercrombie [*F*] recalled seeing Howard at the opening of the first cottages at Letchworth, and said that 'inspired amateurs' like Howard had done much to foster town planning, which was not an esoteric art like architecture.

Mr. B. Seebohm Rowntree and Sir George Pepler jointly proposed the health of Mr. Reiss, to whom the Chairman presented the medal. Mr. Reiss, referring to the New Towns Act, said that to get an Act on the statute book is a relatively small step; if such towns are to be a success they must provide for the welfare and happiness of the inhabitants, and this cannot be done only by improving their environment—you must build human beings, and environment by itself will not improve people; social organizations are necessary. Mr. Reiss recalled a remark made to him by Howard, as an indication of his self-effacement if thereby his projects would be helped: 'I have always wanted to wear sandals, but I realize that if I did I should damage the Garden City movement.'

Some Notes on Vibrations in Structures

By R. H. Wood, Ph.D., B.Sc., A.M.I.C.E., A.M.I.Struct.E., A.M.I.Mech.E.

Introduction. Architects and engineers have frequently to deal with vibration problems in buildings and other structures such as bridges. The large number of enquiries received by the Building Research Station during the past few years indicates a growing interest in this subject. In many instances the enquiries have related to cases where vibrations are merely a nuisance, but in others there has been revealed a genuine alarm concerning the safety of a structure. On other occasions the vibrations have upset trade processes and operations involving the use of delicate or sensitive machinery. Yet another type of enquiry has sought information on how to isolate part, or the whole, of a building from shocks emanating from external sources.

The issue is often not at all clear. For example it has sometimes been found that a building failure attributed to some nearby source of vibration has been considerably complicated by the fact that the foundations of the building are already faulty; or the fact that plaster has been seen to fall at the time that the vibration impulses were felt has merely meant that the plaster had already been loosened by some other cause, and would have fallen sooner or later in any case. Again an engineer may be considerably perturbed at the relatively high frequency vibrations—but of low amplitude—occurring in a bridge, to which he is sensitive, yet at the same time being quite incapable of sensing the much larger deflection taking place in the structure due to heavy static or slow moving loads.

Apart from enquiries relating to acoustics, 'vibration' problems which have been referred to the Building Research Station may be classified as follows: (*a*) systematic vibrations due to out-of-balance machinery; (*b*) impulse vibration due to pile-driving or blasting; and (*c*) traffic vibrations from roads or railways.

Some typical examples taken from actual practice are the following: perceptible vibrations in bridges due to traffic; vibrations in a cinema balcony due to adjacent machinery; ripples on the surface of fluids in tanks causing trouble in process work; vibration troubles in studio photography; suspected damage to churches from nearby blasting; suspected damage to buildings from pile-driving, and from road-breaking machinery; cracking of reinforced concrete beams in a printing works; severe ground vibrations in the vicinity of drop forges; sway problems in buildings due to machinery.

The Effect of Vibrations on the Human Body. It is not generally realized that the human body is a very sensitive detector of vibrations, and that what appears to be a very serious vibration may in fact be a movement of very small magnitude. Amplitudes are not nearly so large as they are often assumed to be. Thus at a frequency of 20 cycles per second, a normal figure for ground vibrations, an amplitude (displacement from mid-position) of 0.0001 in. can just be detected, an amplitude of 0.001 in. is annoying, and an amplitude of 0.003 in. is extremely unpleasant. It will be appreciated at once, therefore, that a study of the sensitivity of the human body to vibrations is most important, as it is on this basis that the engineer begins to judge the safety of the structure. The question arises, is it possible for a structure to be overstressed as a result of vibrations without their first rendering it intolerable for habitation by normal human beings?

Before attempting to answer this question reference will be made to the results obtained by Professors Reiher and Meister of the Technische Hochschule, Stuttgart, on a series of tests to investigate the physiological effects of artificial vibrations. These investigators employed ten healthy persons of different temperaments and ranging from 20 to 37 years of age. The 'patients' were subjected individually upon an experimental platform to vertical and horizontal vibrations of pure harmonic form and of various amplitudes and frequencies. All the movements of the platform, and the frequency, were recorded by suitable instruments. Experiments were made with the persons standing as well as lying down. It was found that vertical vibrations are most strongly felt by persons in a standing position, and horizontal vibrations most strongly by persons lying at right angles to the direction of vibration. Table 1 below gives the typical sensitivity of the human body to continuous vibration.

The amplitudes at which the sensation passes from 'possibly harmful' to 'definitely harmful' will be referred to as the 'intolerable limit'. It will be noticed from the table that these amplitudes decrease as the frequency increases, and that they are surprisingly small. The accelerations are also small compared with that due to gravity; thus even for the 'intolerable limit' the maximum acceleration at 5 cycles is only 0.11 g, and at 50 cycles is 0.153 g. As structures are always designed to withstand the effects of gravity, such small vertical accelerations are of little structural importance, unless the phenomenon of resonance occurs. Similar results were obtained in another series of experiments carried out to determine the susceptibility of persons to shocks. Shocks or impacts in practice may be set about by single or multiple impulses which set a structure in vibration, the vibration dying away until the next impact occurs.

Some Practical Examples of Vibrations. In the case of traffic vibrations, Messrs. Hyde and Lintern state in one instance that 'of fifty records of the (vertical) vibration produced by single motor vehicles passing along public roads in a town at speeds ranging from 3 to 20 miles per hour, the average value of the amplitude* was 0.00016 in., and the average value of the frequency of vibration was 20 per second, the instrument being at an average distance of 20 ft. from the passing vehicle; but vehicles passing over road inequalities may set up momentary vibration of four to five times this average value'.

Other examples are given in Table 2.

The above are merely intended to give a general idea of the amplitudes likely to be met in practice, and, of course, are dependent upon the exact local conditions. By reference to Table 1 they will be found to range mainly from 'clearly perceptible' to 'annoying'.

How Vibrations are Magnified or Reduced. If a structure rests on resilient foundations which give it a certain natural frequency, the movement of the structure, when subjected to external vibration, depends on the ratio of the applied frequency to the natural frequency as well as on the amplitude of the external vibrations. Thus, in the absence of damping, if the applied frequency is very small compared with the natural frequency of the structure the structure will move with almost exactly the same displacements as are applied to the foundations. In like

*The 'amplitude' referred to here is the total movement, i.e. twice the displacement from mid-position which is taken as the amplitude in Table 1.

TABLE 1

	Frequency (cycles per second)				Remarks
	5	10	20	50	
Range of amplitude (displacement from mid-position) inch.	·0004-·0011	·0002-·0006	·0001-·0003	·00004-·0001	Just perceptible.
	·0011-·0032	·0006-·0016	·0003-·0008	·0001-·0003	Clearly perceptible.
	·0032-·016	·0016-·005	·0008-·0018	·0003-·0005	Annoying.
	·016-·043	·005-·013	·0018-·0031	·0005-·0006	Unpleasant. Possibly harmful for long periods.
	·043 upwards	·013 upwards	·0031 upwards	·0006 upwards	Painful. Definitely harmful for short periods.

TABLE 2

Source of Vibration	Amplitude—inch	Frequency—cycles/seconds
Electric train, speed 31 m.p.h., at a distance of 20 ft.	0·00095	26
Pile driving, 240 lb. monkey, 12·8 ft. drop, at a distance of 25 ft.	0·0009	22
Out of balance machinery in printing works: effect on R.C. beam.	0·0028	11·5
Out of balance machines rotating at 320 r.p.m.: effect on cinema balcony.	0·0011	5.3
Blasting. At a distance of 350 yds.	0.00074	—

TABLE 3

Ratio $\frac{\text{applied frequency}}{\text{natural frequency on foundations}}$	0	½	1	1½	2	3
Ratio $\frac{\text{amplitude of structure}}{\text{applied ground movement}}$	1·0	1·33	infinity	0·8	0·33	0·125

manner the structure will respond with the usual static deflections to any applied forces provided that the forces have a relatively low frequency. Conversely if the applied frequency is high the structure tends to remain stationary, this being the well-known principle of the seismograph. Table 3 shows what happens to the structure in between these extreme cases, assuming there is no damping.

When the frequencies, applied and natural, are equal the phenomenon of resonance occurs, and the movement of the structure becomes large, being prevented from reaching infinity by damping, hysteresis, and other causes. It is important to realize that any part of a structure is similarly subject to its own particular resonance, and will vibrate in sympathy with external machinery if the frequencies coincide or nearly coincide. Thus in records taken at the Building Research Station of vibrations in a building due to pile driving, the centre of one of the floors was found to be moving with 2½ times the amplitude of the adjacent walls. Insufficient is known at the moment concerning the damping effects of average building materials, but it may be reasonably assumed that magnification due to resonance will rarely exceed a value of ten.

Can Vibrations Actually Damage a Structure? Apart from earthquake the only possibility of damage to structures must come from repeated vibrations, and the worst case will occur where the range of stress to cause fatigue failure is a small proportion of the normal design stresses. In steel work, for instance, the worst case is in all probability that of welded connections, and we may examine the case where the fatigue range of stress is conservatively taken as ±3 tons per sq. in. superimposed on a design stress of (say) 8 tons per sq. in. We will examine first what would happen to a beam vibrated up to the 'intolerable limit'.

Steel beams continuously vibrated by out-of-balance machinery.—Disregarding for the moment higher modes of vibration, the stress in a beam which is vibrating in resonance with out-of-balance machinery (and this would apply equally well to traffic vibrations) is proportional to the deflection of the beam. The static deflection at working loads is commonly limited to $\frac{1}{325}$ of the span. With a 40 ft. span, for instance, this amounts to 1·47 in. deflection, and assuming that the beam is stressed up to 8 tons/sq. in. the additional fatigue range of ±3 tons per sq. in. would require fatigue amplitudes of $\frac{3}{8} \times 1{\cdot}47 =$ 0·55 in. Now suppose that the vibrations are caused by a high speed machine (say, 3,000 r.p.m. = 50 cycles/sec.), then from Table 1 the 'intolerable limit' of amplitude would be ·0006 in. Evidently the factor of safety *against fatigue* of vibration failure is $\frac{0{\cdot}55}{{\cdot}0006}$ or about 900. For low frequencies, such as 10 per second, the factor of safety becomes (see Table 1) $\frac{0{\cdot}55}{{\cdot}013} = 42$. At a much lower frequency (about 2 cycles/sec.) the factor of safety at the intolerable limit becomes unity, indicating that at these frequencies, an amplitude which could just be tolerated would be sufficient to cause fatigue failure. However, the actual amplitude required to produce fatigue failure is very large (0·55 in.), and no engineer would tolerate a continuous vibration with a total movement of 1·1 in.

Smaller beams on very short spans will have very much lower static deflections, and the amplitudes of vibrations to cause fatigue failure are also correspondingly reduced. It is usually found, however, that for frequencies of 50 cycles per second and over, there is a factor of safety against fatigue failure of at least 5, *i.e.* the vibration would be deemed 'intolerable' by people when the amplitude is only one-fifth of that required to cause fatigue failure. At low frequencies it is theoretically possible for fatigue failure to occur when the vibrations are merely 'annoying' to people, but in such cases the vibrations would need to be sustained by such high out-of-balance forces that they are extremely unlikely. Should the frequency of the vibration approach closely the natural frequency of the beam, however, it is possible that fatigue failure would occur, although usually the amplitudes of vibration to cause fatigue failure would be somewhat greater than the 'intolerable' limit.

To sum up, therefore, we may say that either in some cases the limit of human endurance would be reached before there is any danger of fatigue failure in the structure, or, alternatively in other cases, the out-of-balance forces required would be such that few machines would be allowed to exist without some modification to the balancing arrangements.

Other structures such as brick walls and masonry.—Here again the only condition likely to give trouble is the case of resonance. Available data on the damping qualities of brickwork, etc. is scanty, and in some preliminary calculations an amplification of 10 times the applied vibrations has been assumed. The calculations indicate that horizontal vibrations are more serious than vertical vibrations, and that the worst cases are probably isolated piers or walls which can resonate at some of their higher 'modes' with traffic vibration. However, only in the case of masonry incapable of resisting tension is there any danger of high stresses. Generally speaking, the dynamic stresses are very low, and if any damage is likely to occur it may be as a result of soil settlement aggravated by the vibrations. With the exception of falling plaster and soil settlement the possibility of structural damage is very remote. In the vicinity of drop forges some of the ground vibrations assume the character of those resulting from minor earthquakes. This constitutes a special case to which the foregoing remarks do not entirely apply. Such cases of severe shocks require special treatment.

The Isolation of Vibrations. (*a*) *The seismograph principle.*—Apart from the question of structural damage it is still necessary to isolate vibrations from the point of view of annoyance, for we have seen that human beings are likely to suffer considerable discomfort before the structure is endangered. It was shown above that to isolate vibrations the fundamental procedure is to isolate the structure on a spring system which will give it a natural frequency of vibration which is small compared with the frequency of the traffic or other vibrations to which it is subjected. Now it is known that there is a direct connection between the natural frequency of a system and the static deflection which it undergoes on the

TABLE 4

Deflection (inches)	Natural frequency (cycles per second)
9·80	1
2·45	2
0·61	4
0·15	8
0·02	20
0·006	40

springs due to its own weight. This relationship is given in Table 4.

Traffic vibrations generally range from 15-40 cycles per second, and for effective isolation it would be necessary to have a natural frequency of about four cycles per second, *i.e.* a static deflection on the springs of at least ½ in. It is clearly insufficient to put a layer of thin felt underneath that part of the building which is to be isolated. As the frequency of the vibration falls the necessary static deflection for isolation rises considerably. In considering steel springs, cork or rubber as vibration insulators the deflection is related to the internal stresses and the method of mounting, and in general the problem is one for experts.

(*b*) *Isolation at the source.*—Much the same principle applies for the prevention of the escape of out-of-balance forces from a machine as for the isolation of a structure or part of a structure, and isolation at the source is very often the best and easiest method. The same rules apply exactly, but as the weight of a machine is usually less than that of the part of the building to be isolated the amount of spring material required is less for the same deflection.

(*c*) *Isolation of parts of a building.*—If it is not required to isolate a whole building, part of the building can be isolated by the application of the seismograph principle. The problem here is more difficult, partly because of the increased number of degrees of freedom which will now be discussed in connection with a complete building.

(*d*) *Isolation of a complete building.*—The problem of isolation of a complete building is rendered more difficult by the fact that a building has at least six degrees of freedom, *i.e.* it can sink, displace sideways, displace endways, and rotate about a vertical axis and two horizontal axes. Furthermore, if the building frame is not absolutely rigid the number of degrees of freedom is increased enormously. Thus, for example, with a steel-framed building mounted on springs it is possible for individual stanchions to vibrate at a frequency which could only be determined by an exact analysis of the frame. Horizontal vibrations of the ground may be at least as serious as vertical vibrations so that the spring mounting must allow horizontal as well as vertical movement together with rotational freedom, otherwise the building will transmit certain particular types of ground vibration. The 'seismograph principle' and the necessary deflections apply equally well in the case of movements other than vertical, so that the design of the foundations is a difficult procedure, particularly as it has to incorporate its own damping arrangements (to stop free oscillations due to wind). At present it appears often a simpler matter to isolate vibrations at the source, and this remedy should certainly be examined first before contemplating the isolation of a building.

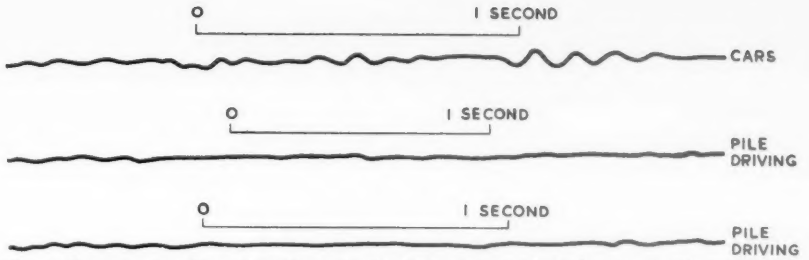


Fig. 1: Comparative effect of traffic and pile driving observed at the entrance to a building. Vertical vibrations (× 250)

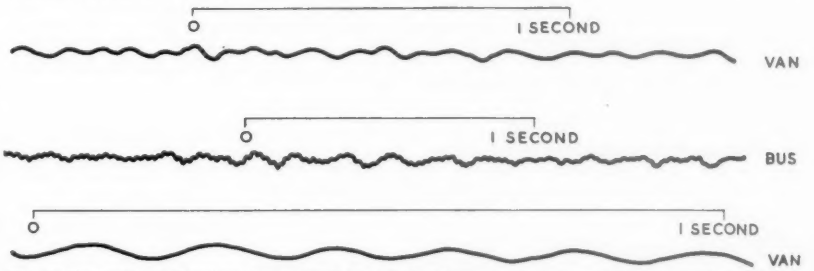


Fig. 2: Records of vibration due to traffic (× 250) observed on ground floor of same building as that in Fig. 1. The high frequencies in the bus record are the result of engine vibrations

One rather novel method of isolation must be mentioned which embodies the foregoing principles. In the case of the cinema balcony previously referred to (see Table 2), the natural frequency of the balcony was altered by attaching a heavy weight to the steel work. This increased, in effect, the static deflection due to its own weight and was sufficient to alter the natural frequency, although the extra deflection was fairly small. Had the natural frequency of the balcony been as low as 2 cycles/sec. it is obvious that this procedure would have made little or no difference (Table 4).

Problems Involving Sway in Buildings. Very often cases of possible sway in buildings due to slow-moving heavy machinery have to be treated as 'vibration' problems. Here again the natural frequency of the particular mode of sway is important, for the building can rock on its foundations as a whole with frequencies determined by the soil constants, or it may bend as a tall cantilever, or part of it may be displaced with respect to the remainder, depending on the stiffness of internal beams, etc. Sway frequencies of complete buildings are very low and typical cases are 0·43 cycles/sec. for a tall steel-framed office building, and 2·5 cycles/sec. for an 8-storey reinforced concrete building. Consequently rocking of buildings due to machinery is very unusual. Wind gusts of relatively longer duration will affect the structure however, and it is customary to treat them as 'static' loading.

The architect is more likely to meet sway cases of the other variety, namely, displacement of floors and beams with respect to the main building due to out-of-balance machinery of the printing press type. In most cases calculations would show that the beams are so stiff as to give a natural frequency (with the machines mounted on them) much higher than that of the machines themselves. As a consequence in most of these cases the out-of-balance forces can be treated as 'static' loading and the beams stressed accordingly. An interesting case of this type was recently investigated by the author where the horizontal sway was nowhere greater than $\frac{1}{32}$ in., but the personnel in the building, due to their own sensitivity, were seriously worried by it.

The sway of a building can be measured with a long plumb-bob suspended from the roof.

Present Day Knowledge and Tests which can be applied. In most cases it is difficult to interpret vibrograph records in terms of the possibility of damage to a structure, beyond the fact that as seen above the vibrations may be such as to cause extreme annoyance to personnel before they will damage the building. In most cases, if vibrations are suspected as a cause of damage, the vibrograph can be used to determine whether or not they are of the same order as normal traffic vibrations, which although annoying, nevertheless rarely cause damage. An instance of this is given in Figs. 1 and 2, which show the results of a vibration survey at a site where pile driving was thought to be causing damage to a building. Clearly this was not the case, the actual cause being a foundation failure.

Acknowledgment. This paper is published by permission of the Director of Building Research.

Review of Construction and Materials

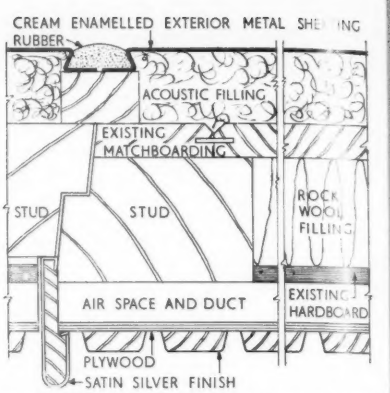
This section gives technical and general information. The following bodies deal with specialized branches of research and will willingly answer inquiries.
The Director, The Building Research Station, Garston, near Watford, Herts. Telephone: Garston 2246.
The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks. Telephone; Princes Risborough 101.
The Director, The British Standards Institution, 28 Victoria Street, Westminster, S.W.1. Telephone; Abbey 3333.
The Technical Manager, The Building Centre, 9 Conduit Street, W.1. Telephone; Mayfair 8641-46.

An Exhibition Train. There have been at least two exhibitions mounted on railway coaches, but it has been left to the Allied Ironfounders to apply the idea to the building industry. They took two 50ft. railway milk vans and adapted them to form a travelling exhibition train, fitting one coach with a range of typical appliances at present available for housing, such as cookers, heating stoves, fitted goods and baths. The three types of fuel, solid, gas and electricity, are represented. The second coach has been made into a reception room and a cinema, wherein 24 persons can see, and listen to, a film entitled 'Pictures in the fire'. The purpose of the train is to 'display and demonstrate a representative selection of these appliances to a technical audience of Government officials, local authorities, architects, builders, builders' merchants and others who share the responsibility for carrying out the nation's housing drive'. The train will be run to some 25 towns, where it will be manned by demonstrators and lecturers who will explain the technical points of the different appliances. Descriptive literature will also be available.

In designing the cinema coach the chief difficulty was sound-proofing; this was successfully done, in the case of the walls, by packing some 2½in. thickness of rock wool against the inside of the original matchboarding and confining it with hardboard; an internal lining of plywood was then fixed ¾in. from the hardboard, thus forming an air space which was useful for taking electric conduits. Vertical slats of satin silver finish timber formed a treatment applied to the plywood. On the outside of the original matchboarding a 1½in. thickness of rock wool was put on, and the exterior was finished in cream enamel sheeting. As the sides of the sheets were recessed to an S-like shape, and as a little clearance had to be left in butting the edges, there was a possibility of rain passing through the opening. This was prevented by fitting rubber cover strips into the recess and screwing them to battens.

The original flooring had a layer of asphalt on boarding, and the problem was to insulate the flooring in the least possible space, as headroom was very tight. It was done by laying ⅜in. fibreboard over the asphalt, then 3lb. lead, then another layer of ⅜in. plywood, then an underfelt on which a carpet was laid. The roof was treated in much the same way as the walls, but an insulating layer had to be applied to the underside of the ventilating upstands. The coaches are air-conditioned.

Mr. Arthur C. Braven [*A*] was the architect and designer of the train, with Mr. Derek Bridgwater [*F*] as consulting architect.



The Exhibition Train. Detail of acoustic treatment of the sides of the cinema coach

British Standards. The British Standards Institution have recently published the following Standards and Codes of Practice.
B.S. 1450. 1948. Pitch mastic flooring. Price 2*s*.
B.S. 1451. 1948. Coloured mastic asphalt flooring (limestone aggregate). Price 2*s*.
B.S. 1000A. 1948. Universal Decimal classification. Abridged English edition. Price 25*s*.
B.S. 15. 1948. Structural steel. Contents: manufacture, quality, tests, margins over and under dimensions and weights, calculation of weights, branding or marking, manufacturer's certificate, tensile test pieces. Price 2*s*. net, post free.
B.S. 449. 1948. The use of structural steel in building. Contents: specification, definitions, materials, loads, permissible stresses, design and details of construction, fabrication and erection, work off site and on site. Illustrated. Price 6*s*. net, post free.
B.S. 1424. 1948. Clay single-lap roofing tiles and fittings. (Dimensions and workmanship only). Contents: pantiles of three patterns, double roman-tiles, flat interlocking tiles, Pooles tiles; their manufacture, colour and certification, dimensions, holing, nibs and fittings. Illustrated. Price 3s. net, post free.
B.S. 460 and 1205. 1948. Cast iron rainwater goods. Contents: general and specific requirements, tables of dimensions, approximate metric equivalents. Illustrated. Price 5*s*. net, post free.
B.S. 381C. 1948. Colour card for ready-mixed paints. A revision of the B.S. standard colour card. 93 colours, including 32 new ones, all grouped according to 7 broad colour divisions. Price 4*s*., post free.
B.S. 1358. 1947. Colours for vitreous enamels. The B.S.I. ask that attention be drawn to this B.S., as it does not appear to be generally known. It contains 14 standard colours for vitreous enamel finishes for domestic appliances, with 3 amended tints. Price 2*s*., post free.
B.S. 1454. 1948. Consumers' electricity control units (rated at 60 amperes A.C.). Contents: the essential requirements for electricity control units intended primarily for use in small dwellings, including single-component and composite units of switchgear and fusegear required for the control and distribution of electrical energy from an earthed neutral, A.C. single-phase. 250 volts, 50 cycles, 60 amperes maximum. Price 3*s*., post free.
B.S. Handbook No. 5. 1948 edition. Domestic fuel and power using appliances. This handbook has been produced at the request of the Ministry of Fuel and Power's Inter-departmental Committee on domestic heating. The handbook brings together, in abridged form, published B.Ss. covering the requirements for domestic equipment, whether for electricity, gas, or solid fuels, with a view of improving their fuel efficiency. It provides in a convenient form the standard by which the efficiency of appliances may be judged. The handbook is divided into 4 parts, the first 3 dealing with gas, electricity and solid fuel respectively, while the fourth describes a number of specifications for miscellaneous appliances, materials and fittings. There are many illustrations and tables of dimensions. The actual specifications should be studied when full details are required, as the handbook does not purport to do more than collect them in a convenient form and give a brief description of them. Price 12*s*. 6*d*., post free.

Codes of Practice
CP.322.103 (1948). Installation of consumers' electricity supply controls for small dwellings. (For A.C. systems.) Contents: general notes, materials, appliances and components, design considerations, work off and on site, inspection and testing, maintenance. Price 2*s*., post free.
CP.326.101 (1948). Protection of structures against lightning. Contents: general notes, materials, appliances and components, design considerations, work off site, maintenance, appendices, diagrams, table of resistances of conductors, explanatory notes. Price 4*s*., post free.
CP.324.101 (1948). Provision of electric lighting in schools. Contents: general notes, materials, appliances and components, design considerations, work off and on site, inspection and testing, maintenance, appendices of typical requirements, tables of recommended minimum illumination, dia-

gram of typical classroom lighting installation. Price 2*s.*, post free.

CP.324.301 (1948). Selection and installation of domestic electric cookers. Contents: general notes, materials, appliances and components, design considerations, work off and on site, inspection and testing, maintenance, tables of space requirements, overall dimensions, and approximate connected load.

Building Science Abstracts. In the July 1948 issue (No. 7, Vol. 21, New Series), Abstract No. 959 gives a précis of an article by B. A. Hall, that was published in the American Concrete Institute's Journal. Although it appeared last year, the subject is still of current interest, being 'Crack control in Portland cement plaster panels'. The wish to use cement plaster slabs in situations exposed to water spray and condensation led to study of the cause and control of cracking in such slabs. The article said that this cracking is due to drying shrinkage, and as the shrinkage stresses are greater than the tensile strength of the plaster, provision must be made for the slab to take its full shrinkage without restraint at any of the edges. The unrestrained method of making these slabs on a metal-lathed suspended ceiling does away with bond and corner reinforcement, and calls for the complete separation of ceiling and wall slabs by a coat of paint, hot paraffin wax, tape or paper strips. The three coats of ceiling plaster may then be placed in advance of any wall plaster and, if drying conditions are properly regulated, all six coats can be put on at intervals of not over 24 hours. The joints along the edges or junctions of panels may be concealed by the wall plaster or by moulding.

An Example of Ritual Planning

From 'Through China's Wall', written and illustrated by Graham Peck. The author is an American and writes of the time of the Chinese Republic, just before the Japanese invasion. The art of ritual planning is almost defunct in these functional days; yet the lives of generations of mankind in many civilizations have been conditioned by it and it has given birth to much superb architecture.

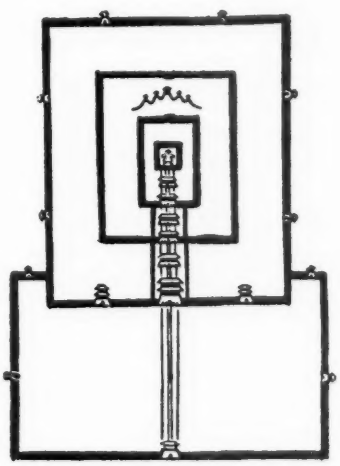
LIKE EVERY proper house, tomb, temple, village and town in China, Peking was originally located and planned in accordance with the rules of Feng-Shui, or geomancy, that ancient science or superstition governing the selection of auspicious locations. Through the centuries the lore of Feng-Shui has accumulated as many prejudices and blind formulæ as must boil through the mind of a sparrow deciding between two crotches for its nesting-place, but like the instinct of the sparrow, Feng-Shui has almost always resulted in the choice of a superbly suitable location. The Feng-Shui architects of Yung Lo, fifteenth-century founder of modern Peking, wished to place the city where it would enjoy the protection of the five dragons—the subterranean dragon whose corrugated back is seen in the crests of hills and mountains, the earth-bound dragon whose twisting tail is seen in the winding courses of rivers, the restless, invisible wind dragon, the rain dragon whose body is made of clouds, the celestial dragon who stares at the world through the burning disc of the sun. In consequence they located Peking on a plain guarded from the winter winds by mountains in the north and west, irrigated by the waters of a stream which emerges in miraculous quantities at the Jade Fountain, and tempered all year by wonderfully clear and balanced weather.

Feng-Shui also prescribed that cities must stand at the northern ends of plains; the successive invasions of China have always come from the north and cities so situated can best defend the farmlands which feed them. Peking had the logical site for a capital, since it stood at the northern apex of the Great Plain of China which stretched south from there for hundreds of miles, embracing the lower valleys of the Yellow and the Yangtze Rivers, the historic home of the race.

Its location mystically established, the plan of Peking was arranged with the same regard for the occult. Laid out in the days of absolute empire, it was naturally planned less as a city in our sense of the word than as a home for one man, the Emperor, the great Son of Heaven. Its walls were carefully aligned with the outer directions, north, south, east and west, and in Peking, where the Emperor sat, the fifth or central direction took on a meaning it could have in no other place.

South of the main city was laid out a walled suburb, for the artisans and merchants; then in the centre of the main city were erected the walls of an Imperial city for officials and the Emperor's servants. In the centre of the Imperial city the moat-encircled walls of a Forbidden City were planned; in this gigantic palace only the Imperial Household could live. And in the centre of a hall in the centre of the Forbidden City was placed the Dragon Throne where only the Son of Heaven could sit.

Straight south from the throne-room stretched an avenue to the outer gate in the farthest wall. Wherever it passed through one of the concentric walls there were five great gates, one for each of the five ranks in the Central Kingdom. Where it crossed a canal there were five marble bridges. Where it descended an incline there were five carved staircases. Straight south from the throne itself a marble causeway, reserved solely for the Emperor, led down the centre of the wide avenue. The central gates, the central bridges, the central stairs, were for his use alone.



Around the Emperor as a nucleus the city was disposed in a fabric in which the five elements, the five colours, the five ranks, and the five nations were arranged in their proper tributary positions, though of course the first categories of many of these classifications were centred right on the Dragon Throne; it had pre-empted the central directions, the colour yellow, which was forbidden for non-Imperial use, and so on. Since the Son of Heaven was the kernel of the city's diagram, Peking was furthermore felt to be the centre of all things, and every farthest object in the Empire, every creature, every tree, every pebble, contributed to the centripetal pattern radiating out from the city.

This setting for one man's apotheosis had survived its users quite intact, and during those first months in China I never failed to be moved when the orbit of my trivial doings impinged upon one of the grand axes. Bundling across town in a rickshaw, I frequently found myself being drawn down the marble causeway, under the sacerdotal archways and across the consecrated bridges. Even to an Occidental, an outlander whose remote country had no part in its plan, this spine of the city was impressive as the central nerve of an arranged universe. It was not hard to realize what a place of awe the concentric cities must have been to the old Chinese, steeped in the mystic classifications. As for the Emperor himself, however, the hub of the great wheel, the peak of the pyramid, the navel of all creation—even riding down his sacred causeway I could never grasp what he must have felt. It was appalling to think that every time he ascended the Dragon Throne he was conscious that all the world lay about him, in relation to him. Still he spent a good deal of time on it and the fifth direction could hardly have been a comfortable seat. Dressed in heavy brocaded robes of yellow, the colour he alone could wear, he perhaps spent a good part of his mental energy calculating how he could scratch without being noticed.

Publishers: William Collins for Readers' Union, London, 1945.

Practice Notes

Edited by Charles Woodward [*A*]

IN PARLIAMENT. War Damaged Houses (Rebuilding). Asked whether it was on his instructions that officers of local authorities, to whom he has delegated powers, withhold licences for the complete rebuilding of war damaged houses until applicants have come to prior agreement with the Commission as to the amount of the claim ultimately to be made on the Commission, the Minister of Works replied: Yes, Sir.

Asked further in view of the considerable delay which has occurred in many instances owing to the need for applicants to seek this prior agreement, and in view of the fact that this provision is not in the War Damage Act, will the Minister consider withdrawing the instruction?, the Minister replied: No, Sir. This was done in order to assist the applicant and to see that the applicant did not become committed to a licence beyond a figure the War Damage Commission were prepared to give. (20 September 1948.)

Ordnance Maps (Reprints). Asked what procedure is adopted by the Ordnance Survey Department to check the accuracy of one-inch-to-the-mile maps which are being reprinted with slight modifications; and, in particular, what action has been taken to ensure that footpaths, cart-tracks, and river crossings are correctly mapped, the Minister of Agriculture replied: Before a one-inch-to-the-mile is reprinted surveyors of the Ordnance Survey Department investigate on the ground any comments from the public and other information brought to notice, including any about footpaths, minor roads and river crossings. Cart-tracks, as such, are not specially depicted. (20 September 1948.)

War Damage Claims. Asked if he is aware of the dissatisfaction of the people with regard to the treatment of late war claims; and what action he is taking, the Financial Secretary to the Treasury replied: The policy now being followed by the War Damage Commission when dealing with late claims for war damage payments is in accord with the powers conferred by Parliament. It has been extensively publicized and no further action therefore appears necessary. (20 September 1948.)

Planning Permission (Application). Asked under what authority a person wishing to move a field gate to a position 20 yards farther along the main road is required to fill in the application in quadruplicate and to supply four copies of the site plan, the Minister of Town and Country Planning replied: Applications for planning permission under the Town and Country Planning Act, 1947, have to be made to local planning authorities in accordance with regulations made by the Minister. Under the present Making of Applications Regulations they may require up to four copies of applications and plans. I am sending the hon. Member a copy of the regulations and of the explanatory circular which accompanied them. (21 September 1948.)

Common Law Rights. Asked what steps he is taking, through employment exchanges or other Government agencies, to make known to those employed in industry and elsewhere their full legal rights under Common Law for damages for negligence in lieu of those to which they may be entitled, in cases of injury under State Insurance, the Minister of National Insurance replied: I cannot undertake to advise people as to their Common Law rights, but I may point out that as the result of recent legislation a claim to damages is no longer an alternative remedy, but can be pursued concurrently with a claim to benefit under the Industrial Injuries Act. (21 September 1948.)

Town and Country Planning. Asked whether the concession as regards single plot owners who bought before 7 January 1947, extends to those who before that day entered into a binding contract to buy but to whom the land was not conveyed before that date, the Minister of Town and Country Planning replied: Yes. (24 September 1948.)

War Damage Payments and Professional Fees. For the information of Members the following question and answer in Parliament which appeared in these Notes in April 1946 is repeated:

Asked whether he would take steps to see that the charges made by architects and surveyors in respect of preparing specifications of war damage, supervising repairs and rendering of claims, should not fall upon the claimants as they are unable to recover the reasonable cost of complying with the requirements of the War Damage Commission, the Chancellor of the Exchequer replied that such fees for preparing a specification conveying directions to the builder and for supervising the execution of the work are paid by the Commission who, however, have no power to repay the cost of assistance in preparing and submitting a claim.

Asked further whether he was aware that in actual practice fees which are charged are very much in excess of those amounts and that they have to be paid by the person who has suffered war damage, the Chancellor replied that he must move within the field of the present law, and the answer he had given sets out what the present law provides. (14 March 1946.)

TOWN AND COUNTRY PLANNING ACT 1947. The following dates should be borne in mind in connection with the Act:

31 *December* 1948. Work begun or contracted for before 1 July 1948 in accordance with an operative planning scheme, or an interim development permission granted before 22 July 1943, or at a time when there was no effective resolution to prepare or adopt a scheme, must be the subject of an application under Part III to complete or carry out the work and be made before 31 December 1948. If permission is refused *by the Minister* either on appeal or if the application is referred to him for determination, compensation may be payable under section 79 for abortive expenditure, which includes the cost of the preparation of plans. To qualify for compensation an appeal against the planning authority's refusal must be made to the Minister under section 16. The Minister may grant permission subject to conditions. This procedure is necessary because permissions under schemes and interim development permissions granted before 22 July 1943 (the date of the passing of the 1943 Act) lapsed on 1 July 1948.

31 *March* 1949. Under the Regulations claims for depreciation of land values must be made to the Central Land Board by 31 March 1949 otherwise any right to claim on the £300 million fund will be lost. The Board have a discretion to extend the time until 30 June 1949.

30 *June* 1949. Under section 80 an application to the Minister that land is ripe for development must be made by 30 June 1949, unless the Minister extends the time. If the Minister is satisfied that the conditions under section 80 apply and issues his certificate to this effect, then no development charge will be payable.

30 *June* 1951. Where work or use of land contravenes previous planning control, then an enforcement notice under section 75 must be served by 30 June 1951. This provision does not apply to work carried out or use begun during the war period as defined by the Building Restrictions (Wartime Contraventions) Act, 1946. After 30 June 1951 an enforcement notice cannot be served.

30 *June* 1951. An application may be made to the Minister under section 85 that land held on charitable trusts or for ecclesiastical or other charitable purposes on 1 July 1948 shall not be subject to development charge. The application must be made by 30 June 1951.

30 *June* 1951. If an agreement made under section 34 of the 1932 Act is modified or rescinded within three years from 1 July 1948, the owner may apply for the Minister's consent to have the development value under Part VI of the Act calculated as if the agreement had been modified or rescinded immediately before 1 July 1948. This is provided for in paragraphs 10 and 11 of the 10th Schedule of the Act.

31 *December* 1952. If the right to receive a payment out of the £300 million fund is assigned, the Central Land Board must be notified in writing not later than 31 December 1952. This is provided for in paragraph 7 of the Claims for Depreciation of Land Values Regulations, 1948. Where a claim on the £300 million fund is made, paragraph 8 of the Regulations requires notice to be given to the Central Land Board if before 1 January 1953 an enforcement notice under section 75 is served, or a notice to treat is served or a contract is entered into for the acquisition of the land by an authority who could compulsorily acquire the land. The notice must be given in writing within 30 days of the happening of the event.

Sale of Land at 'existing use' Value. The powers of the Central Land Board under

section 43 of the Act to acquire land are to be exercised in accordance with the following statement made by the Chairman of the Board.

Central Land Board and Powers of Purchase. The Chairman of the Central Land Board, Sir Malcolm Trustram Eve, K.C., told a meeting of the Law Society at Brighton (on 22 September) about the steps which the Board have been authorized by the Minister of Town and Country Planning to take, in view of the fact that in many cases land is deliberately being sold at its full value, including development value.

One of the objects of the Town and Country Planning Act, 1947, is that land should be sold at its value for the use to which it is being put at the time of sale. Then, when development takes place, and the developer pays a charge to the Board, he will not have paid for the development value twice over. In addition, the seller will have his claim on the £300 million fund for loss of development value.

Sir Malcolm said he was afraid that the inflated prices being paid at the moment would be passed on to whoever occupied the building when the land was developed, or alternatively, that purchasers would not come forward, and approved and urgent development would be held up. The Board had, therefore, asked the Minister for his approval in principle to the exercise of their powers under the Act to buy land. This would be done in cases where they were satisfied that it was deliberately being offered for sale or had been bought at a price considerably above existing use value, including cases where the transaction was coupled with an assignment to the purchaser of the vendor's claim on the £300 million. Owners would be informed that the Board did not wish to buy land if an undertaking were given that it would be sold at its existing use value. Where agreement was not arrived at, however, the Board could be authorized in appropriate circumstances to buy the land compulsorily.

They had hoped to be able to operate the Act without the threat or the use of land purchase, at any rate in the early days, but they had already plenty of evidence that many owners were selling land on terms unfair to prospective developers.

NATIONAL JOINT COUNCIL FOR THE BUILDING INDUSTRY. The Council have amended National Working Rule 2 in respect of Working Hours, and the amendment will operate as from 1 October 1948. The effect will be to empower Regional Joint Committees to approve a different Winter period for any locality.

Rules 2A and 2B have also been amended as from 3 October 1948, and provide for a Common Pay Week, i.e. midnight Sunday to midnight Sunday, with Thursday in all Regions being payday. Rule 2A concerns payment for lost time, and Rule 2B deals with termination of employment.

The amendments are published in detail and may be obtained at the offices of the National Joint Council, 11 Weymouth St., W.1.

EDUCATIONAL BUILDINGS, 1949. **Circular 180** issued by the Ministry of Education deals with the Programme and Procedure for the 1949 Building Projects. Projects submitted by Authorities and falling within the categories of Circular 155 but not included in the Programme will be placed on a reserve list (1949). Some of these can be transferred to the 1949 Programme in due course, if they have been approved in principle and if building prospects improve or one of the projects in the existing Programme has to be deferred. The planning of projects on the Reserve list should be carried, as soon as is practicable, to the point at which they can be put in hand without undue delay. During the year other projects of £5,000 and over, which are neither in the Programme nor on the Reserve List (1949), may become unexpectedly urgent; the Ministry will be prepared to consider these on their merits.

The following will not be included in the Programme being sent to Authorities: (*a*) School Meals projects not forming part of a larger project. Separate allowance has been made for these in the Ministry's Programme; (*b*) projects under £5,000: these, like the larger projects, must be limited to cases where the need is urgent. Primary and Secondary school building proposals again constitute the bulk of the Ministry's Programme. The projects included under this head for the country as a whole are more than twice the quantity on which work is likely to have been started in 1948. Even so, they will include a substantial proportion of arrears carried forward from the 1948 Programme, and will be barely sufficient to keep pace with the requirements of new housing estates and of the additional children who will be coming into the schools as a result of the rise in the birthrate. If these requirements are to be met, an even larger programme will be necessary in 1950 and 1951. It is, therefore, essential to press on with the preparation and submission of plans not only of projects on which it is hoped to start work in 1949, but of others on the Reserve List. It is equally important to hasten the submission of plans of Further Education projects. Many of these projects are larger than Primary or Secondary schools, and the planning stage is more complicated and will take longer. The Minister hopes that Authorities will place special emphasis on this part of their building programme, and in view of the need for more provision for technical education in the interests of industrial efficiency and the economic well-being of the country he is prepared to consider an increase in the amount of labour and materials for this purpose, if Authorities are able to accelerate their planning. The Minister has been concerned to give priority to those projects which appear to meet most directly the three major requirements set out in Circular 155, paragraph 9, viz. new schools to meet new housing developments, accommodation to take increased numbers resulting from the rise in the birthrate and the provision of additional facilities for technical education. The Minister hopes that, while concentrating on the substantial building programme outlined in this Circular, Authorities will not lose sight of the needs of those schools where conditions are bad but no major building work can be carried out for the present. A higher standard of maintenance, including the use of bright and attractive paints and better care of cloakrooms and offices, can do much to improve amenities in poor buildings, and even in present circumstances improvements to sanitation or minor repairs not involving steel can often be carried out where pressure on the local building labour force is not heavy.

Procedure for the submission of plans will still be as described in paragraphs 15–18 and the Appendix to Circular 143, except that the number of bricks needed is not now required and WBA/Materials Priority will be awarded by this Ministry without prior reference to the Ministry of Works. The procedure described in Circular 143 will apply to all except operational projects.

From 1 January 1949 the operational procedure will be discontinued except for second or third instalments of jobs for which the contract for the first instalment has been let under the operational procedure before 31 December 1948. One effect of this is that the new revised procedure (not the operational procedure) will normally be used for any projects now in the operational programme which have to be transferred to the 1949 Programme.

The existence of annual building programmes facilitates placing of orders for materials or components for more than one project at the same time with consequent reductions in price. Where the system of construction has been approved the Minister wishes to encourage this procedure, and where materials are not controlled no difficulty should arise. Under the Materials Priority Scheme application for a 'symbol' must be made on Form B.M.104. Quantities required to be ordered in advance for each project should be submitted on a separate Form B.M.104, and the Ministry will award a separate Priority symbol.

For iron and steel the Ministry will assist Authorities by using their powers of forward authorization so that these materials for more than one project may be ordered at the same time or by guaranteeing an issue of so many tons per quarter for, say, each quarter of 1949. This can only normally be done for large programmes with a standardized form of construction approved by the Ministry. The period in which delivery is requested must be related as nearly as possible to the date when the material will be needed on the site. Whether bulk ordering is adopted or not, steel should be ordered at the earliest moment, particularly with steel for heating installations.

Timber licences can only be issued for the current period, and the Ministry will help by giving an undertaking that the necessary licence will be issued when the required period is reached. These authorizations depend on a provisional starting date

which may be arranged with the Regional Priority Officer, who will obtain the date from the Regional Building Committee when he knows the estimated cost of the project and when the Authority expect to be able to start work on the site. The date cannot be given until final plans are submitted.

If an Authority's Standing Orders hinder bulk ordering the Minister hopes they will modify them in appropriate cases. If a separate loan is applied for to cover this advance ordering, the Minister will consider such an application, but generally this should not be necessary since the loan sanction for each project will normally have been issued by the time that work starts on the site.

MINISTRY OF HEALTH CIRCULAR. Circular L.R.L.20/48 informs authorities in the London Region that the Minister agrees with the recommendation of the Joint Contracts Tribunal in their recommendation that clause 18 of the R.I.B.A. Contract should be added to by the addition of clause 18A. (This clause was printed in the R.I.B.A. JOURNAL for July 1948 on page 418.) This decision does not affect the Minister's objection to the proposal (*b*) in paragraph 1 of Circular L.R.L. 4/48. *Note.* An extension of time under clause 18A would not give rise to a claim by the contractor for additional overhead costs.

FACTORIES ACT, 1947. The Minister of Labour and National Service has made new regulations under the Factories Act, 1947, for the safety, health and welfare of workers employed in building operations. The Regulations, which are entitled the Building (Safety, Health and Welfare) Regulations, 1948, came into force on 1 October 1948, and will supersede the existing Building Regulations under the Acts which were made in 1926 and 1931. (S.I. 1948, No. 1145, obtainable at H.M. Stationery Office, price 10*d.* post free 11*d.*)

ROYAL INSTITUTION OF CHARTERED SURVEYORS. The Royal Institution have published a revised Scale of Charges with effect from 1 September 1948. This Scale cancels all previous issues. One of the revisions is that the fees for valuers in cases of compulsory purchase of property have been doubled.

Correspondence

THE U.N. BUILDING

Sir,—The reactions of Mr. Robertson and Mr. Passmore to my letter on the U.N. Building compel me to clear up my argument in some way. I am thankful to both correspondents for their sympathy, but they have somewhat misjudged the essence of my words and my convictions.

The essence of my argument was that New Architecture is capable of more than the jejune U.N. office building which is to be erected in New York; also that it can produce a building of greater dignity and nobler character within its own limits. It is wrong to suppose that this argument of mine has anything to do with the need for eclecticism that Mr. Passmore has discovered to be necessary among the public. A need like this, if it really exists, is due to the fact that functional building in its higher aspects is of too little interest to hold the attention of the public. This objection could be avoided by criticizing functional building on these grounds, and by trying to stimulate modern architects to some idealism above the mere matter-of-fact work which functional building tends to promote. This is what I am trying to do—not by recommending eclecticism—but by asking that the possibilities of new architectural expression should be sought.

I did not write—as seems to be suggested—because my own work has been misunderstood, but merely on behalf of the development of New Architecture. Pioneering thirty years ago in functional building, I met misunderstanding; today fighting to help functional building to rise to art-in-building, I shall meet misunderstanding anew; this is clear but is of no importance. The importance is only that functional building at the moment is in a phase of self-sufficiency which is the best state to lead it quickly and totally to an end, and, as a matter of fact, by eclecticism if we are not attentive!

We ought to be aware of the fact that functional building is the basis of New Architecture, but that it is not yet New Architecture itself. It is not yet art-in-building. New Architecture is more than the solution of present practical needs with contemporary building machinery. It is above all the result of idealism in the mind of the architect. It is the outcome of his force of æsthetic expression. We want a lot more idealism than functional building generally offers today. Æsthetic expression is the language of architecture. Without this expression a building is 'deaf-mute'. The U.N. Building planned for New York is nearly 'deaf-mute'. The effort Mr. Harrison makes to work out the scheme of the Committee is useless. A building is an organism as a whole, not an indifferent core slightly re-formed to give it an acceptable shape. Its growth should not be allowed to resemble the process of dressing a woman who is going to be made beautiful by changing and disguising her figure. This leads to fashion, not to style. For the U.N. Building, we must claim style!

The organism of a building like that for the U.N. has to be a creation from the very first beginning, based on and in continual interaction with the essential conditions. It will never become a creation by remodelling a preconceived neutral scheme. It is a mistake to think that the impersonal effect of teamwork like this can be at the same time the expression of a universal spiritual idea. By no means! A spiritual idea in architecture is never unintentional. Lacking such an idea, a work of building activity may be a clever piece of engineering science but it will fail to move us. As there is no emotion in it, it lacks perceptible well-being. It is not architecture!

And the site? Yes, the site chosen for the U.N. Building is a very bad one. It should have been rejected for a building of so high a standard! The aim of a building for the U.N. is not to cure the town planning of New York but to lift up the world!—Yours faithfully, J. J. P. OUD [*Hon. Corr. Member*]

RETIREMENT OF MR. F. G. BAKER

Sir,—I was delighted to see the tribute to Mr. Baker which appeared in the September JOURNAL.

It is nearly forty-one years since I went to the R.I.B.A. and made Baker's acquaintance, and I am glad to say friendship. He was then junior to Charles Tanner (Chief Clerk) and Herbert Tayler (Assistant Secretary). Though wild horses would never have drawn the truth from him, I soon discovered that so far as administration and office work were concerned, Baker was doing practically everything,—everybody else's work as well as his own. He had always one serious fault: he *would* work too hard! So hard, in fact, that he was often on the verge of breakdown and at least twice right over the verge.

When I started keeping a record of hours of work I soon found that he was always the last to leave. His hours were so preposterously long that I had to take a stern line and insist on his 'knocking off' earlier. But he was always trying to escape from the rule!

I am sure that every member who came in contact with him—and in over forty years that must mean an aggregate of several thousand—came away with the same impression, unstinting courtesy, kindness and helpfulness, and patience that never seemed to fail.

The R.I.B.A. can never have a more devoted and whole-hearted servant, and I hope his retirement will at last give him an opportunity for real rest which he has denied himself for so long.

To me he was a friend to whom I can never be sufficiently grateful.—Yours faithfully, IAN MACALISTER

THE PROFITS OF AN ARCHITECT'S PRACTICE

Sir,—Last year you thought my office costing of sufficient general interest to publish in the November 1947 JOURNAL. I have just had my annual accounts prepared, and if you would like to publish the result, preserving my anonymity, you are quite welcome to do so.

Year ended 31 July 1948:

Fees received	£1,941
Expenses	486
Profit	£1,455

This is for a single-handed practice conducted in one room. The outgoings are, as will be seen, almost exactly 25 per cent of the gross.—ANON.

Note by the Editor. Our correspondent's outgoings for 1946 and 1947 were respectively 27 and 28 per cent of the fees received.

Book Reviews

A Town Plan for the Urban District of Turton [Lancs], by *Reginald Dart*. (Turton U.D.C.) 11 in. × 8½ in. xv + 77 pp. + 84 pls. + 18 maps and diags. Turton. 1947.
The Urban District of Turton, lying on the foothills of the Pennine Range, embraces twenty-seven square miles, and is a green heart in a cordon of urbanized districts devoted largely to the cotton industry.

It is said not to have suffered appreciably from the blight of past industrial booms, and the many effective illustrations in the report indicate that it is rich in fine buildings and places of historic interest, although there are at least three areas of low standard housing due for early replacement.

The plan for a new Turton, the work of the Council's engineer and surveyor, is a model which many similar authorities could follow with advantage in view of the present need for 'positive plans' for areas requiring to be laid out afresh and for town extension schemes. Its basic aim is twofold; the creation of a well-knit town centre in the south-east, embracing existing development in the Eagley, Bromley Cross and Bradshaw wards, and the retention of the open country as a green belt tract.

One of the most arresting features of the Town Plan is that for the reorganization of railway station facilities. Mr. Dart puts forward a proposal for a new traffic centre, combining a more convenient passenger station with one for bus services linked by a parkway entrance to the new 'place' at the town centre.

The district is singular for having more acres than people in a comparatively populous tract of country. It will, therefore, be like finding an oasis on a caravan route to come upon the compact and well-planned new town which the Turton Council hope to create from the old, in the heart of a green belt area. J. F. ADBURGHAM [*L*]

The Economy of Timber in Building, by *R. G. Bateson*. 8½ in. xi + 96 pp. text illus. Crosby Lockwood. 1948. 7*s*. 6*d*.
There is a traditional tendency to take timber for granted as a building material, and the scientific study of wood is a comparatively recent branch of research. The present crisis in supplies obviously demands the most rigid economy, and the book has been primarily written with an eye to current restrictions, but the author has a deep concern for the proper use of wood in buildings in general, irrespective of the quantity employed. His views, personal rather than official, are based on long experience as a timber scientist. They deserve close study.

1496-1946. A Study of Continuity. [Darknall family and Richard Durtnell and Sons.] By *C. S. Durtnell*. 9 in. × 7 in. (iv) + iv + 16 pp. text illus. priv. prin. [1946.]
Histories of building firms, especially country builders, are rare, and this story of a family in the Penshurst, Chiddingstone and Sevenoaks area is of interest, with illustrations of ancient buildings it occupied. The book is presented by Owen Fleming [*F*].
H. V. M. R.

Modern Church Architecture, with 50 illustrations of Modern Foreign Churches, by *Edward Maufe*, R.A. (Incorporated Church Building Society.) 8½ in. 59 pp. text illus. The Society. [1948.] 5*s*. 6*d*.

Modern Church Design, by *Richard Mellor*, F.R.I.B.A., F.R.S.A. 8½ in. 136 pp. + (8) pls. text illus. Skeffington and Son. [1948.] 12*s*. 6*d*.
Modern Church Architecture is a companion to the Incorporated Church Building Society's *Fifty Modern Churches*. Unlike the latter book, which is devoted solely to English examples, *Modern Church Architecture* is intended to bring to 'clergymen, architects, students, members of Study Circles and Discussion Groups, etc.' a selection of foreign churches. In this aim the book may be successful, but architects will find it an hoary collection. With one or two exceptions the churches chosen for illustration are not 'Modern' in the sense normally attached to the word, but are the efforts of those smitten by Symbolic-Reductionist tendencies, overwhelming presumption and undisciplined individualism —epithets which it should never be possible to apply to the architect of a church. Few of these churches 'pray for themselves', few have any real atmosphere and few qualify for the exalted standard which every Consecration and Dedication Feast reminds us should be found in a church. The text of the book accepts all these churches as 'Modern' and thus is likely to lead astray those for whom it is primarily intended. Mr. Maufe does indeed stress the allowance which should be made for the effect of conditions of climate, material, temperament and the form of worship natural to the denomination which built the church, but this is hardly sufficient for architectural adolescents. We are told that there is a danger of the Church building in an outworn traditional manner and becoming dissociated from contemporary thought. There is no danger; dissociation is a fact. In an age of unbounded materialism, the Church stands embattled and intrenched, an oasis in a repelling wilderness. It is, however, legitimate to expect the Church to take all that is best in contemporary æsthetic strivings and to rededicate them for use in the advancement of church architecture. For this reason it would have been of transcending value if this book had contained a simple guide to the credo of the contemporary secular architect.

The most important part of the book is the illustrations. It is a pity that the standard of reproduction falls short of that in *Fifty Modern Churches*, and that the possibilities so pregnant in the New Empiricism of the Scandinavian countries are unnoticed. However, the omission of plans is thankfully recorded, as this will mitigate unintelligent plagiarism quite unsuitable to worship based on the Book of Common Prayer.

The Incorporated Church Building Society is to be congratulated on publishing a book which is probably the only means of introducing to many people recent foreign churches, and it is an unenviable task to have to be critical of the results.

Modern Church Design is written by an enthusiast for the Established Church, who in season and out drives home the importance of the architect. Mr. Mellor's book should be read by all those for whom *Modern Church Architecture* is intended. The dust cover, the photographs and the diagrams—Nos. 15 and 16, oh dear!—are far from being a guide as to the general excellence of the text. Many will be astonished to learn that 'Each architect will design his church . . . in the style he considers appropriate to the occasion, remembering his surroundings, his materials and his construction. Inventive genius and good taste do the rest'. The vexed question of style is wisely eschewed, but Mr. Mellor does not entirely hide his own personal preferences, why should he, indeed? Irritation results from the author's desire not to tread on any pet corns and to avoid a charge of discrimination against new materials—with the abundance of fine materials available, why trouble to make an altar of concrete even though technical advances may now permit of a decent finish? Generally, the advice given on a multitude of matters is very sound; although the array of movable furniture shown on the diagrammatic plans for various types of Sanctuary will be joyfully taken as a precedent for an increase in knick-knacks, already all too numerous in most churches. But these are very minor quibbles upon a very worthy book. The presence of a few spelling mistakes should not pass unrecorded. G. G. PACE [*A*]

Cornerstone. A Study of Britain's Building Industry, by *David Hall*. 7½ in. vi + 153 pp. Lawrence and Wishart. 1948. 7*s*. 6*d*.
The frontier between economics and politics is never easy to define, but it is clear that economist David Hall regards them as identical territory. Readers expecting an objective survey of the building industry find themselves floundering in a dreary world of virtuous proletariat and tyrannical capitalism. There is of course much sense in what the author says, but very little in the way in which he says it.

They Made a People, by *B. Price Davies*. 8½ in. 309 pp. Cardiff: Building Estimator Pubns. 1947. 12*s*. 6*d*.
A retired architect, surveyor and engineer, familiar to most readers of the R.I.B.A. JOURNAL for his Building Estimator Publications, has turned to a less practical but probably more satisfying form of authorship. He has written the story of the men and women who migrated from other counties to the Glamorganshire valleys at the beginning of this century, when the South Wales coal trade touched its peak of prosperity. The result is scarcely a novel, but rather a succession of tableaux depicting the mining community from many aspects and in varying moods. The author loves the people whom he describes, writes with deep feeling and sincerity, and has taken enormous pains over detail. As a social history of the place and period, his book is extremely interesting and valuable. J. C. P.

Notes and Notices

NOTICES

Inaugural General Meeting, Tuesday 9 November 1948 at 6 p.m.
The Inaugural General Meeting of the Session 1948-49 will be held on Tuesday 9 November 1948 at 6 p.m., for the following purposes:—

To read the minutes of the Eleventh General Meeting of the Session 1947-48 held on 22 June 1948.

Mr. Michael T. Waterhouse, M.C., B.A. (Oxon.), President, to deliver his Inaugural Address of the Session.

To unveil the portrait of Sir Lancelot Keay, K.B.E., M.Arch. (Lvpl.), Past-President, by James Gunn.

The Reception of New Members at General Meetings
The procedure for the introduction and reception of new members at General Meetings has been revised and is now as follows. New members will be asked to notify the Secretary R.I.B.A. beforehand of the date of the General Meeting at which they desire to be introduced and a printed postcard will be sent to each newly-elected member for this purpose. On arrival at the R.I.B.A. new members must notify the office of their presence and will then take their places in the seats specially numbered and reserved for their use. On being asked to present themselves for formal admission, the new members will file out in turn into the left-hand aisle and after shaking hands with the Chairman will return to their seats by way of the centre aisle.

It will not now be necessary for new members to be accompanied by supporters.

Formal admission will take place at all the Ordinary General Meetings with the exception of those on the following dates:—
9 November 1948 Inaugural Meeting.
8 February 1949. Presentation of Medals and Prizes.
5 April 1949. Presentation of Royal Gold Medal.
NOTE.—There will be no General Meeting on 23 November 1948 and therefore no formal admission on that date.

Exhibition of Architects' Working Drawings, 18-25 November 1948
An exhibition of Architects' Working Drawings will be held at the R.I.B.A. from 18 to 25 November 1948 inclusive, between the hours of 10 a.m. and 7 p.m. (Saturday 10 a.m. to 5 p.m.). The exhibition will contain the drawings that a practising architect hands to a contractor.

A special Students evening will be held at the exhibition on Tuesday 23 November at 6 p.m., when all students are cordially invited to attend. It is hoped that the architects who have lent exhibits, or their representatives, will be present to explain the drawings. No cards of admission are required. Refreshments will be provided.

Architectural Competitions—Assessors' Awards
All architects who take part in architectural competitions are reminded by the Council of the R.I.B.A. that participation in a competition is a definite acceptance of the principle that the award of the assessor is final and binding upon themselves as well as upon the promoters, and that any competitor who feels that he has real ground for dissatisfaction with an assessor's award should communicate with the Secretary of the R.I.B.A.

Further, all architects, whether competitors or otherwise, are reminded that discussion or correspondence in the public or professional Press which tends to criticism or disparagement of an assessor or award cannot alter the final and binding effect of the award, but may prejudice architects and the whole competition system in the opinion of the public, and is therefore highly undesirable.

Architectural Science Board
British Standard Specifications.
Members of the R.I.B.A. Standard Specifications Committee who wish to bring any particular B.S.S. matter to the attention of the Co-ordinating Committee, are asked to communicate with the Secretary to the A.S.B.

BOARD OF ARCHITECTURAL EDUCATION

R.I.B.A. Final and Special Final Examination, July 1948
The questions set at the Final and Special Final Examination held in July 1948 have been published and are on sale at the Royal Institute, price 1*s.* (exclusive of postage).

R.I.B.A. Final Examination
Mr. Ronald H. King [*Student*], London, has been awarded *Distinction in Thesis.*

ALLIED SOCIETIES

South Eastern Society of Architects—Kingston-upon-Thames Chapter
The incorporation of the Kingston-upon-Thames District Chapter will take place at a reception to be held in the Guildhall, Kingston-upon-Thames, Surrey, on Friday 29 October 1948 at 7 p.m. Buffet. Dress optional. Members wishing to attend should contact the Honorary Secretary, Mr. D. Phillimore Taylor [*A*], 19 Lovelace Gardens, Surbiton, Surrey.

Essex, Cambridge and Herts Society of Architects (West Essex Chapter)
During the week-end, 2-3 October, the Chapter organized a series of visits in London. On Saturday morning a party of about eighty members and guests visited the Bank of England where they were shown the 'Parlours' and the sub-basement power house. After a luncheon in the Strand, the party split up. About thirty went to the Palace of Westminster where they were shown over the partly built new House of Commons and the remainder visited the London University Senate House where they were shown the halls, offices and libraries. To round off the day, the party dined together at Pinoli's and a visit to Wyndhams Theatre to see 'The Gioconda Smile'.

On Sunday a party of about twenty attended Matins at St. Paul's Cathedral and in the afternoon about forty visited Freemasons Hall, Great Queen Street.

Several members from the Southend and Chelmsford Chapters attended the week-end.

The Indian Institute of Architects—Presidential Address
In his Presidential Address, delivered at the First General Meeting of the Indian Institute of Architects in Bombay on 12 August 1948, Professor S. S. Reuben [*F*] said: 'We in India must evolve our own new style of architecture that will be in keeping with ancient traditions and yet suit the needs of modern India, a style of architecture which is modern in scope but which is national in spirit and distinctive in character'.

When Professor Reuben referred to India's acute housing problems and appalling slums in some of her principal cities, he reminded architects that they had a special responsibility in Independent India. The housing problem was one of the most acute problems of today. Professor Reuben deplored the fact that, while on the one hand Bombay, the 'Urbs Prima in India', had such magnificent architectural achievements like the Gateway of India, there also existed 'such wretched hovels that it would be difficult even during daytime to find a dropped coin without lighting a match'. It was for the architects of the future to plan better buildings with proper ventilation and lighting, good systems of drainage and more open spaces and gardens, but 'never to lose sight of art'.

Dealing with town planning he stressed the necessity of a policy of decentralization, in order to relieve the burden on cities, especially Bombay, owing to influx of refugees. This could only be tackled by planning satellite towns round main cities such as Bombay ; he insisted on the need for National Parks as part of India's programme of post-war reconstruction.

The President urged the improvement of traffic organization in keeping with the pressure on roads today, the checking of the tendency to allow 'India's lovely coastline' to be disfigured by ill-considered building development, and while pointing out defects in the location of certain vital public institutions, he suggested that on arterial roads, buildings should be erected only on a set-back of 220 yds.

Regarding architectural education in India, Professor Reuben said: 'The time is now opportune for the Institute to formulate its own long-term architectural education policy as well as to make itself responsible for the running of an architectural school and the holding of examinations for entrants to the Institute'. His concluding remarks stressed the need for more schools of architecture in the various Provinces and States, and he felt that the Indian Institute of Architects should give a lead in that direction.

GENERAL NOTES

R.I.B.A. Golfing Society
A meeting of the R.I.B.A. Golfing Society was held at Sundridge Park Golf Club on Wednesday 1 September, and the results were:
The Allensby Bowl and Society Spoon won by Alan Walker, with a score of 78−6=72; Runners up : E. H. Firmin, 82−6=76, C. Tucker 94−18=76.

The afternoon 4-ball bogey competition was won by John Grey and Felix Wilson with a score of 7 up.

The Physical Society—'Concert Hall Acoustics'
The Acoustics Group of the Physical Society has arranged a meeting for Thursday 4 November, to discuss modern views on concert hall acoustics. A number of musicians, music critics, scientists and architects will be taking part, and the discussion will be opened by Mr. Hope Bagenal [*F*], D.C.M., F.M.A. The discussion is intended to review the position particularly in respect of concert halls for London. The meeting will take place at the Royal Society of Arts, 6 John Adam Street, London, W.C.2, at 2.30 p.m. Tea at 5.15 p.m.

Colour and Lighting in Factories Course
The Council of Industrial Design announce that, jointly with the British Colour Council, it is organizing a short lecture and study course at the R.I.B.A. on 24, 25 and 26 November 1948, on the subject of colour and lighting in factories and on machines.

The course will concentrate on the visual aspect of the subject and is primarily intended for architects and interior designers. Further details may be obtained from the Council of Industrial Design ('Colour Course'), Tilbury House, Petty France, London, S.W.1. on application by letter giving brief details of qualifications and interest in the subject.

Obituaries

Jean-Joseph Caluwaers (*Hon. Corres. Member*), a prominent Belgian architect and former President of the Societe Centrale d'Architecture de Belgique died on 24 March 1948, aged 85.

M. Caluwaers was trained at the Academie de Belgique and the Bureau de l'Architecte Beyaert, commencing private practice about 1890. He practised in Ostend but mainly in Brussels. His principal architectural works were schools and churches at Ostend, buildings and pavilions for exhibitions held in Milan, Turin, Gand and Brussels and workmen's houses at Ixelles. He held many official appointments, including that of Architect in charge of the amenities and beauties of old Ostend, Government Architect to the Exhibitions held in Milan and Turin and he was Architect to the Minister for Colonies.

President of the Société Centrale d'Architecture de Belgique in 1905 and in 1910 and one of its most prominent members, M. Caluwaers held many honorary and advisory appointments in Belgian learned societies, being Honorary President of the Permanent Committee of the International Congress of Architecture, a foundation member of the Belgian Federation of Architects and Corresponding Member of the Commission Royale des Monuments (Belgian Office of Works).

M. Caluwaers' literary work was extensive, mostly concerning ecclesiastical architecture, palaces, country houses and monuments and their history.

M. Max Winders, Vice-President of the Académie Royale d'Archéologie de Belgique, from whom most of the above particulars have been obtained, says that amongst the many honours bestowed upon him, M. Caluwaers' honorary corresponding membership of the R.I.B.A. was one of those of which he was most proud.

Herbert William Tee [*L*], Borough Engineer and Surveyor to the Wandsworth Borough Council since 1939, and who died on 18 July last, was 49. Formerly he was with the Woolwich Borough Council from 1932 to 1939 as Borough Engineer and Architect, having previously been Deputy Borough Engineer from 1931.

In his municipal duties he acquired great experience in the preparation, design, specification and estimates for libraries, welfare centres, public baths and markets, and at Woolwich supervised the erection of the electricity showrooms, cemetery chapels, the new municipal offices, building works and transport depot, the extension to the electricity generating station, Central Health Centre and the public baths at Eltham. He was the architect of several housing schemes (in one case including 2,060 houses), and was responsible for the layout and construction of a large number of parks and open spaces with appropriate buildings.

At Wandsworth Mr. Tee was principally engaged with the repair and rebuilding of war damaged properties, but at the time of his death had made preliminary preparations for six housing projects now in course of development.

Isaac Taylor [*F*], who was a partner with Mr. W. Cecil Young [*F*] at 195 Oxford Road, Manchester, died suddenly on 28 July, aged 78. Mr. Frank B. Dunkerley [*Ret. F*] has sent the following appreciation:

'Isaac Taylor was a very well-known man to the members of the Manchester Society of Architects. He was the son of J. Medland Taylor, who was a president of that Society in 1880-81, and who had a very large practice in the days of the Gothic revival and built a great number of churches in the north, and numerous schools and rectories. I am afraid their design and detail are not of a type to evoke much admiration from the critic of the present day.

After he left school young Isaac went into his father's office, and remained there, except for one year in a London office, as a premium-paying pupil.

After his father's death he carried on the practice alone for some years, but later he had one or two very able assistants, and his own work was largely of a voluntary nature, especially for the Church of England Waifs and Strays Society in adapting old mansions to their new purpose.

Soon after the outbreak of the 1914-18 war he came and shared my office.

Mr. Taylor was President of the Manchester Society of Architects from 1918 to 1920. During those years Isaac Taylor and I became great friends.

He was one of the most wonderful people I ever knew. He never lost his temper and was always cheerful. He was so entirely natural, quite careless of his dress and appearance, but a perfect friend and colleague. Both he and his wife, who survives him, were devoted to the Church of England, and they both shared a keen taste for music.

I saw very little of him after the war. Cecil Young [*F*] soon afterwards became his partner. I last saw him about three years ago when he was still very active, and I hear that to the end he came regularly to his office.'

Walter Edward de Souza [*A*], who practised principally in Rangoon, Burma, but went in later years to live in Jersey, Channel Islands, was 60 at the date of his death on 3 July. He was trained at the Architectural Association School of Architecture when he left Clare College, Cambridge, and later served in the offices of Sir Edwin Lutyens and of Sir Herbert Baker.

About 1920 Mr. de Souza commenced practice in Rangoon, and designed churches, domestic buildings and business premises for private firms and municipal undertakings; he undertook extensive arbitration work for the High Court of Rangoon. He subsequently ceased practice in Burma to become Managing Director of E. M. de Souza and Co., Manufacturing, Wholesale and Retail Chemists, Burma, afterwards retiring to Jersey.

Edgar Dugdale Dennis [*L*]. The death was announced on 3 August of Mr. E. D. Dennis, aged 63. He practised in Blackpool, and designed St. Mark's Parish Church, Blackpool, and carried out additions and renovations to St. John's Church, and to St. Paul's Holy Trinity Church there. His other architectural works were housing schemes for the Blackpool Corporation and many private residences and hotels in Blackpool and district in the inter-war years.

Mr. Dennis was trained in the office of the late John Hutton of Kendal, from 1901 to 1906, and practised at Sedbergh, Yorkshire, from 1907 to 1910.

H. Quentery Farmer [*L*], an architect well known in Macclesfield, died on 20 August aged 67 after a short illness. Mr. Farmer went to Macclesfield in 1914, and was a Fellow of the Manchester Society of Architects. For a period he was a member of the Advisory Panel of Architects for the Council for the Preservation of Rural England. He was responsible for designing a number of domestic buildings, schools and business premises in Macclesfield, notably the Ash Grove Council School there. Since 1941 he had been associated with the War Damage Commission, Manchester.

Review of Films—6

The country of origin and date of release are given first. The film is in monochrome unless otherwise stated. The sizes (35 *mm. and* 16 *mm.*) *are given. Sound films are marked 'sd.', and silent 'st.' The running time is given in minutes.*
(F) indicates free distribution.
(H) indicates that a hiring fee is payable.

Picture Paper
Britain 1946 [*F*]
Summary. The film opens with shots showing how a picture paper is produced. A reporter is sent to collect a story about the survey which is being made as a prelude to producing a new plan for the town of Middlesbrough. Visits are paid to the team of planners, many of them architects, who are making the survey. They are seen at work on the plans and collecting information from the town dwellers on the type of lives they lead, the houses, the schools, clubs and shopping facilities available. The film is an attempt to show how in a modern democracy, scientific methods can assist in solving the problems of replanning, rehousing, industrial development and traffic flow. The information is given through the eyes of a reporter, and the film shows how it is used to produce an article for PICTURE POST.
Appraisal. A very human film, well thought out with good photography, and commentary. Of more interest to reporters than architects or planners as the subject is treated in a popular rather than a technical manner, and no positive results of the survey are shown.
35 sd. 16 sd. 19 minutes. Central Film Library, Imperial Institute, S.W.7. (Reference U.K. 881.)

Proud City
Britain 1945 (*F*).
Summary. A film which explains how the County of London Plan came into being, with Professor Sir Patrick Abercrombie and Mr. J. H. Forshaw, the authors of the plan, in the chief roles. An analysis of the living conditions in London prior to and after the war is used to illustrate the vital necessity for planning not only for housing, but health, recreational and social facilities as well as the co-ordination of rail and road transport, etc. Bomb damage gave a magnificent opportunity to build a new city of dignity and convenience for all, and the work of preparing the plan is seen through the eyes of the Architects' Department of the L.C.C. Particular emphasis is laid on the advisability of retaining the existing community groups in and around London, and this is demonstrated very clearly in a series of

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maps. Some examples of good planning and housing are used effectively to show what could be achieved along similar lines in London.

Appraisal. A very well thought out film which holds the attention throughout. The objects of the plan are explained clearly and concisely, and the sequences follow in logical order. Possibly rather much analysis at the expense of human interest. Nevertheless, a first rate film, which has the merit of actually showing what can be done by co-ordinated planning. The photography is of a very high order, and includes some magnificent shots of London. The film is one which deserves to be seen by a wide public.

35 sd. 16 sd. 26 minutes. Central Film Library Imperial Institute, S.W.7. (Reference No. U.K. 595.)

Britain Can Make It: No. 17. Part 2: The Heliodon

Britain 1947 [*F*]

Summary. A short film explaining the heliodon —an instrument for reproducing by means of a model of a building and a movable lamp, the extent to which daylight will fall on a given point of a building at a given time or season of the year.

Appraisal. Neither the need for this particular instrument nor the way it is used is sufficiently explained to make the subject of interest to general audiences. From the architect's point of view the film is too superficial to be of value, 35 sd. 16 sd. 11 minutes. Central Film Library. Imperial Institute, S.W.7. (Reference U.K. 837.)

Members' Column

This column is reserved for notices of changes of address, partnership and partnerships vacant, or wanted, practices for sale or wanted, office accommodation, and personal notices other than of posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

CORRECTIONS TO R.I.B.A KALENDAR 1948-49

Mr. Eric H. Davie [*A*], who is shown as Northern Group Architect of John Lewis Partnership, is now Staff Architect to Messrs. Hillier, Parker, May & Rowden, an appointment he took up in November 1947.

Mr. Joseph Fielden Dixon's [*A*] name was omitted in error from the list of Associates. His address is 16 Bryanston Street, London, W.1. Telephone Welbeck 4949.

Mr. Arthur Benedict Gransby's [*A*] name was omitted in error from the list of Associates. His address is 92 Eton Rise, Hampstead, London, N.W.3. Mr. Gransby changed his name by Deed Poll in August from 'Gavronsky.'

Mr. E. A. D. Tanner [*F*], whose name was omitted in error from the Kalendar, has been appointed Architect to Messrs. A. Boake, Roberts & Co., Ltd., Chemical Manufacturers, Carpenters Road, Stratford, London, E.15, and will be pleased to receive trade catalogues, etc., at that address.

Mr. John H. Markham's [*F*] telephone number is VICtoria 7651.

Mr. Edmund C. Mason's [*A*] address is Invicta Cottage *not* Invicta College.

The address of **Mr. John Charles Morris** [*A*] shown on page 330 should read 4 Tudor Drive, Otford, near Sevenoaks, Kent, and *not* 'Oxford' near Sevenoaks.

APPOINTMENTS

Mr. G. M. Boon [*A*], whose address is 'Cuppers', Castle Church, Stafford has been appointed Architect to the Lotus Shoe Company, Stafford.

Mr. Sylvester J. Castellino [*A*] has been appointed Junior Architect on the National War Academy Project Organization, Poona, and will be pleased to receive trade catalogues, etc., at 11 Wanowrie Barracks, Wanowrie, Poona.

Mr. T. A. Collins [*A*] has been appointed County Architect to the County of Leicestershire. His office is at County Offices, Grey Friars, Leicester.

Mr. A. J. W. Morrison [*A*] formerly of the City Architect's Department, Newcastle-on-Tyne, has now taken up an appointment as Senior Architectural Assistant with the Department of Public Works, Pretoria, South Africa. His office is at New Government Buildings, Vermealen Street, Pretoria.

Mr. W. O. Oakley [*A*] has been appointed Architect to the County Tyrone Education Committee and will be pleased to receive trade catalogues, etc., at the Education Offices, Omagh, Co. Tyrone.

Mr. J. Rutter [*L*] has terminated his appointment with the Borough Engineer's Department of the Sunderland Corporation and commenced duties as Area Architect to the National Coal Board, No. 1 East Durham Area, Northern Division, Station Road, South Shields, Co. Durham. He will be pleased to receive trade catalogues, etc., at that address.

Mr. B. W. Stuttle [*F*] relinquishes his position as Borough Engineer and Surveyor, Town Planning Officer and Architect to the Stepney Borough Council's Housing Schemes on 21 October, 1948.

Mr. L. J. Tucker [*A*] has taken up an appointment as Estates and Housing Surveyor with the County Borough of Doncaster and will be pleased to receive trade catalogues, etc., at the Estates and Housing Department, 15 South Parade, Doncaster.

Mr. Randolph St. G. Whelan [*A*] has resigned his appointment of Planning Officer in the Ministry of Town and County Planning to take up an appointment as a Regional Architect in the Ministry of Health at its Regional Office, 12 Queen Anne Terrace, Cambridge, where he will be pleased to receive trade catalogues, etc.

Mr. R. Allport Williams, M.B.E. [*A*] has been appointed Deputy County Architect to the Cumberland County Council and will be pleased to receive trade catalogues, etc., at the Cumberland County Council offices, 15 Portland Square, Carlisle.

Mr. T. Ruddiman Wood [*A*] formerly of the Ministry of Health, No. 1 Region, has now taken up duties as Architect to the South-East Metropolitan Regional Hospital Board with offices at 27 Queen Anne Street, London, W.1.

PRACTICES AND PARTNERSHIPS

Mrs. Dorothy P. Brazier [*A*] has, by mutual agreement, withdrawn from the firm of **Frank Tranmer.** The remaining partners, **Mr. Eric Brown** [*A*] and **Mr. Harry Bailey** [*A*] are continuing the practice under the same firm name of **Frank Tranmer,** with offices at 3 Victoria Avenue, Harrogate and 1 Park Road, Bingley, Yorkshire.

Messrs. J. Clems & Son, Architects and Surveyors of 1 Headland Villas, North Hill, Plymouth, have opened a London office at 234 Blythe Road, Hammersmith, London, W.14 (RIVerside 6693) under the supervision of **Mr. Geo. T. Heward** [*L*] who will be pleased to receive trade catalogues, etc.

Mr. J. B. Lawson [*A*] has commenced practice at Queen's Road Chambers, East Grinstead, Sussex, where he will be pleased to receive trade catalogues, etc.

Mr. R. W. Owen [*L*] who has relinquished his position as Architect to the Docks Engineers, British Railways, Southern Region, and who has taken up an appointment as consulting Architect and Surveyor to the Plascott Construction Company, 146 St. Mary Street, Southampton, as well as private practice at the same address will be pleased to receive trade catalogues, etc., there. His private address, 22 Cumberland Place, Southampton, remains unchanged.

Mr. R. Owen Vine [*A*] and **Mr. C. Malcolm Vine** [*A*] practising as **Vine & Vine** [*A*/*A*] have taken into partnership **Mr. F. A. M. Selley** [*A*]. The title of the firm, remains unchanged. They practise at Tudor Chambers, Station Road, Wood Green, London, N.22.

CHANGES OF ADDRESS

The new permanent address of **Mr. Albert H. Clarke** [*A*] is 'Brae,' Over Road, Almondsbury, near Bristol (Almondsbury 3145). He is Hon. Secretary of the Bristol Society of Architects.

Messrs. Foster and Barber (*L*) have removed from their temporary offices at 8 High Street, Ramsgate, to new premises at 8a Queen Street, Ramsgate, Kent (Ramsgate 844).

Mr. Arthur F. Lodge [*A*] has removed from 124 North View, Eastcote, Pinner, Middlesex, to Bank House, 317 Gloucester Road, Horfield, Bristol 7.

Mr. David E. Morrison [*A*] of 91 Parkway, Regents Park, London, N.W.1 announces his new telephone number as GULliver 4774.

Messrs. W. H. Saunders and Son [*L*], Architects and Surveyors of Southampton and Portsmouth, have now obtained permanent accommodation for their Channel Islands office, and from 18 October that branch operates from 4 Library Place, St. Helier, Jersey, C.I. (Central 2942), where they will be pleased to receive trade catalogues, etc.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

Licentiate desires purchase general practice on or near South coast, or would consider partnership. Box 186, c/o Secretary, R.I.B.A.

Practice in Yorkshire coast town for sale owing to death of principal. Excellent connections; audited accounts available for inspection. Box 181, c/o Secretary, R.I.B.A.

Well-established practice for sale in South-East Kent. Box 187, c/o Secretary, R.I.B.A.

WANTED AND FOR SALE

For sale. Complete set 20 Wren Society volumes; perfect condition. Best offer over 20 guineas to Box 183, c/o Secretary, R.I.B.A.

For sale. 'Early Rennaissance in Italy,' Baum (German Text, 517 illustrations), 21/-, 'Architects', Builders' and Civil Engineers' Technical Catalogue (COUNTRY LIFE, 1946), 18/-. R.I.B.A. JOURNALS Vol. 53 (1946), nos. 5-9, Vol. 54 (1947), 1-13 and Vol. 55 (1948), 1-10 inclusive, price 1/- per copy, plus postage. Box 182, c/o Secretary, R.I.B.A.

For sale. Antiquarian drawing board, together with fitted adjustable stand and mahogany ebony edged T-square complete. Offers to Box 185, c/o Secretary, R.I.B.A.

For sale. Pine plan chest comprising four drawers, taking double elephant, 5 in. and 7 in. deep, and four drawers, size 1 ft. 9 in. by 2 ft. 6 in. of same depths. Overall dimensions of inlaid table top with bullnose edges, 6 ft. 9 in. by 3 ft. 4 in. Height 3 ft. Offers to Box 178, c/o Secretary, R.I.B.A.

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